"Learn from yesterday, live for today, hope for tomorrow.
The important thing is not to stop questioning."
Albert Einstein

"To raise new questions, new possibilities, to regard old problems from a new angle, requires creative imagination and marks real advance in science. "
Albert Einstein

"Risk is the inescapable flipside of opportunity.
Each time you choose one, you get the other as well."
Ulrich Beck

University of Alberta

A Case Study of the Canadian BSE Crisis as an Opportunity for Learning and Changes

by

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A thesis submitted to the Faculty of Graduate Studies and Research
in partial fulfillment of the requirements for the degree of

Master of Science
in
Rural Sociology

Department of Rural Economy

Edmonton, Alberta
Fall 2008

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395, rue Wellington
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Your file Votre référence
ISBN: 978-0-494-47185-2
Our file Notre référence
ISBN: 978-0-494-47185-2

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Canada

DEDICATION

I would like to thank first and foremost my mom and dad for their constant support in pursuing my heart song in the field of environmental sociology. I dedicate this work to the people of the soil—farmers and those who deeply care about agriculture—for giving me the opportunity to cultivate my knowledge and experience in the miraculous act of growing food. I would also like to acknowledge the source of my fascination with plants and animals seeded long ago, my grandparents' little farm. I thank the Department of Rural Economy for offering me this life-changing experience and the Alberta Prion Research Institute for their generous funding..

ABSTRACT

A crisis can be an opportunity for learning and changes, as well as cause members of society to (re)evaluate the roles and effectiveness of key institutions. This research aims to test the extent to which the Canadian bovine spongiform encephalopathy (BSE) crisis proved to be an opportunity by examining evidence of learning and changes in the perceptions, practices and organization of beef producers, representatives of beef-related organizations and businesses, and government representatives in the Peace Region in Alberta. BSE did serve as an opportunity for learning and changes but not to the extent of reflexive modernization. Although the reoccurrence of a BSE crisis in Canada is unlikely because of policies in place, the conclusion cannot be made that another BSE crisis will not occur. The same factors that prevented reflexivity in the BSE crisis may play a role in turning food safety issues into crises in the future.

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Chapter 1 INTRODUCTION

1.1 *Statement of the Problem*

The world is entering a new age of risks which are different from previous forms of risk in that they are not just natural hazards but human-made from science and technology and/or political choices (Harrington, 2005). Of the multiple definitions of risk, Beck's will be applied in this thesis: "risk may be defined as a systematic way of dealing with hazards and insecurities induced and introduced by modernization itself" (Beck, 1992, p.21). Compared to previous risks, these contemporary risks are more invisible, incalculable, and unpredictable. Such risks also have a broader global impact on nature and society. Examples of contemporary risks include nuclear technology, climate change, pollution, and food-related crises like bovine spongiform encephalopathy (BSE), also known as "mad cow" disease.

There is a widely held notion that crisis can generate opportunities for learning and changes (Beck 1992; Dror 1993; Elliot et al., 2001; Habermas,1987; Rosenthal & Kouzmin, 1993), including reforming institutions and policies (Boin & t'Hart, 2003). Learning and changes may occur to different degrees, including to the degree of reflexive modernization. Reflexivity is a critique of instrumental/scientific rationality which focuses on maximizing efficiency and affectivity. Scientific or instrumental rationality refers to dominant technical discourses utilized by scientific experts (Mythen, 2004). Unlike social rationality, it does "not engender affect and cannot develop a concern for being, which is necessarily a priority in the risk society" (Adam, Beck & van Loon, 2004, p.226).

Social or value rationality stems from the cultural evaluations convened though everyday lived experience (Mythen, 2004, p.56). Modernization refers to the process society undergoes through industrialization and other social changes that completely transform the lives of individuals (van Loon, 2003). Combining the two terms, reflexive modernization refers to the modernization of modern society; "a process by which key institutions and the principles of society are transformed" (Beck et al., 2003, p.1). This research focuses on Beck's theory of reflexive modernization, which states that out-of control processes and unintended side-effects from modern's society's science, technological, and/or political choices will trigger fundamental societal transformation.

Society is governed by a combination of scientific and social rationality. Modern western society's rationality is dominated by scientific rationality and underutilizes social rationality. According to Beck, for societal transformation, the current discourse must change. As stated by Albert Einstein, "society can not solve problems by using the same kind of thinking that was used when the problems were created." Furthermore, not only are the risks produced less comprehendible, but society using these risks has also become less comprehendible to the extent that modernity has exceeded the concepts with which sociology has been trying to understand modern society (Beck, 2007). The theory of modernization is no longer adequate, thus modernization needs to be modernized by being self-critical and self-aware, in other words reflexive, leading to reflexive modernization. The combination of scientific and social rationality shapes our institutions and thus directs our society. The current institutions and

epistemological systems constrain contemporary debates on risk (Adam et al., 2004) because they focus on scientific rationality. Additionally, the current institutions do not have the necessary criteria for assessing new technologies and risks. A democratic decision process is also lacking (Beck, 2007). The central argument of Beck et al. (2003) is that the changes occurring to society as a result of globalization and risk will undermine society's foundations (legal, economic, corporate, parliamentary), resulting in the questioning of contemporary approaches to problem-solving and institutionalized answers.

BSE is a consequence of instrumental rationality which has developed from modernized food production methods—the push for efficiency and profit—leading to unsafe animal feeding practices (Miller, 1999). BSE is considered a contemporary risk issue for two reasons. First, BSE is considered a man-made problem with global consequences. Second, calculating of the probabilities of BSE and new variant Creutzfeldt-Jakob Disease (vCJD) failed since society was not able to conceptualize the consequences (Adam et al., 2004). In other words, the exact number of infected people is unknown because of uncertainty about the number of infected cattle that entered the food system and a five to ten year latency period before disease onset. Estimates of vCJD infections ranged from a few hundred to millions, creating public panic about this invisible, uncomprehended and unquantifiable disease, thereby providing an ideal opportunity to spur reflexive modernization. The theory most often applied to BSE is reflexive modernization by Ulrich Beck, who asserts that "the theory of reflexive modernization has to be worked out theoretically and tested empirically"

(Beck et al., 2003, p.2). This case study empirically tests the theory of reflexive modernization by applying it to the Canadian BSE scenario.

1.2 *Background of the Problem - Canada's BSE*

In May 2003, Canada announced its first BSE case. Up to December 2007, eleven more BSE cases have been found. In Canada, there are two main divergent perspectives on the BSE crisis. The first is that Canada had learned numerous lessons, the crisis was well-managed and is now resolved. Furthermore, BSE will be eliminated from the Canadian herd by 2017 (Alberta Agriculture Food and Rural Development [AAFRD], n.d.; Center for Disease Control [CDC], 2008; Standing Senate Committee on Agriculture and Forestry [SSCAF], 2004). The other view is that the lessons have not been learned to the degree of reflexive modernization, that BSE is a symptom of underlying problems in modern intensive agriculture. Therefore, BSE may be just one of numerous food crises in the future and it's possible that "this is just the beginning," as warned by Dr. Haydon, former Health Canada scientist (Canadian Health Coalition, 2001; Nickerson, 2003; Suzuki, 2005).

1.3 *Research Objectives*

Based on the widely held notion that a crisis can be an opportunity for learning and changes, in addition to cause members of society to (re)evaluate the roles and effectiveness of key institutions, this research aims to test to what extent the BSE crisis served as an opportunity by examining evidence of learning and changes in the perceptions, practices and organization of government and various

organization representatives, as well as beef producers in the Peace region in Alberta, Canada. Did learning and changes reveal elements of reflexive modernization? The central objective is to contribute to the literature on learning and changes following the BSE crisis. The objectives of this thesis are to examine the following:

1. Whether BSE was defined as a crisis at the local level;
2. The extent to which BSE crisis lead to tendencies of reflexive modernization; and
3. The relative differences in reflexive modernization tendency/resistance among the beef producers, government representatives and beef-related organization representatives.

1.4 *Potential Benefits of the Study*

1.4.1 Significance of the study

At the beginning of this project, most studies on BSE focused on the United Kingdom (UK) and its policies, thus there was a gap in literature on the responses of Canadian agents who play a key role in how the BSE scenario unfolds. These agents include beef producers and representatives from beef-related organizations/businesses, as well as local and provincial government. This study provides data and information that will be useful in understanding if the BSE crisis served as a learning event. There exists a significant set of influences that determine the responses to the BSE crisis. The goal was to locate common threads and themes that are evident in the interviews and relate to reflexive modernization. A greater understanding of responses to agricultural crises such as

BSE may assist in improving strategies for future agricultural crises response and provincial legislation initiatives.

This research is significant for the following reasons:

1. Contributes to the current gap of information on the impact of BSE in the Canadian context;
2. Applies the theory of reflexive modernization to BSE at a community level whereas Beck's work has been theoretical and at the national level; and
3. Assesses the likelihood of a BSE-like saga occuring in the future if insufficient learning and changes occurred.

1.4.2 Purpose of the study

This study is part of a greater project on the social and economical consequences of BSE in Alberta being conducted by the Department of Rural Economy at the University of Alberta and funded by the Alberta Prion Research Institute. This research tests the widely held assumption that crisis is an opportunity for effective reflexive modernization in the Peace region by examining the response of beef producers as well as the role of various institutions such as government and beef-related organization/business members in influencing responses to the BSE crisis. Media analysis has been conducted on the major newspapers of Peace municipal district (M.D.) No. 135 and Barrhead county. Barrhead county's response to the BSE crisis has already been studied by Broadway (2005) and this research involves interviewees' responses from the Peace region. A cross-comparison of the newspaper analysis from both Peace M.D. and Barrhead county as well as the case studies of the two communities will provide indispensable data for further research in the future.

The research objectives and questions were informed during the initial phases of the case study through literature review of BSE, responses to agricultural crisis, in addition to theories on crisis, learning and reflexive modernization. Furthermore, salient concepts and themes, plus some key informants, were gathered and identified during the newspaper analysis.

1.4.3 **Study Limitations**

The scope of this study has the following limitations. The amount of time spent in the field collecting data and the amount of respondents consulted will be limited to a reasonable time available within the masters degree. To fully understand all the issues at hand, a longer-term study with more cases may be necessary. The goal of this case study is to maximize field sampling within reason. Additionally, the responses of some participants were restricted in what and how much information they wanted to disclose. Some important respondents were probably missed or unknowingly excluded from the study—the various tests described in Section 3.6 were used to minimize error. This study does not intend to evaluate or quantify the effectiveness of the current socio-political relationship between farming communities and certain individuals. This is also pertinent for current relationships with governments and their representatives. Secondly, this study does not intend to create an end plan for the regions' communities regarding responses to agricultural crisis such as BSE.

Chapter 2 LITERATURE REVIEW

2.1 *Bovine Spongiform Encephalopathy*

BSE is an incurable, fatal, brain wasting disease that affects cattle specifically, but other species of animals can also be affected by transmissible spongiform encephalopathy (TSE). The currently accepted theory is that mutated proteins, called prions, cause BSE. However, to date, no experimental evidence has definitively demonstrated the transmissibility of BSE to humans, either by direct inoculation or through oral consumption of affected tissues (Pennington, 2003). Some studies have identified a similarity in the BSE prion protein and prion protein from vCJD affected individuals. New vCJD has different disease characteristics than other forms of CJD. For example, it appears in young people and has a relatively long duration of illness. These findings, in addition to evidence that CJD can be transmitted to humans, raise concern that BSE could be transmitted to humans (Ratzan, 1998).

In 1986 the first cases of BSE were reported in England. Clinical cases of BSE were unrecognized at the time and the origin of infection is suspected to have occurred in April 1985 from ruminant-derived meat and bone meal (MBM). In 1981/1982, England had changed their animal waste rendering practices by reducing the temperature during production and by reducing the amounts of hydrocarbon solvent used for extracting tallow. This change resulted in increased exposure to incompletely inactivated scrapie agent from sheep offal. After a 4 to 5 year incubation period, the first BSE case occurred and the disease incidence increased rapidly. By February 1995, about 143,100 cases of BSE had been

confirmed on 32,006 farms in Great Britain. At that time, numerous other European countries reported BSE but none of them had over 120 cases. The European Union banned the feeding of mammalian protein to ruminant animals in 1994. However, countries able to distinguish ruminant from non-ruminant wastes were permitted to feed non-ruminant protein to ruminant animals (Bradley, 1996).

2.2 *BSE's Impact Around the World*

As with other major environmental controversies, the BSE crisis has had a significant impact on the world in four fundamental ways, according to Beck (Adam et al., 2004; Beck & Willms, 2004; Beck 2007). First, the BSE crisis made obvious the link between nature and society by highlighting society's dependency on food production systems for survival and by exposing the vulnerability of humans to animal diseases, weakening the fictional divide between nature and society. Second, the crisis revealed the limitations of science since science does not completely understand BSE. Third, science became the source of uncertainty because it produced a hazard by allowing ruminant parts in ruminant feed. Lastly, due to the uncertainty in scientific expertise, political decision makers and society had to find new sources to deal with future threats.

The largest BSE crisis to date occurred in Britain, and was of such magnitude that many consider it to be the greatest disaster in the European food industry, "as such [BSE] presents an enormous challenge at every level of socio-cultural organization: farming and the food industry, science, politics and policy, public health, the media, and…the consumers" (Allan, Adam & Carter, 2000,

p.117). In the UK, the crisis disintegrated the public's trust in scientists and the scientific method and forever changed their trust in government (Curnow, 2002).

According to van Zwanenberg and Millstone, "one of the long-term effects of the BSE crisis upon public policy-making in the UK and EU has been that it forced a reconceptualisation and an institutional reorganization of science-based risk policy-making" (2005, p.27). Van Zwanenberg and Millstone base this finding on the following observations throughout time. Prior to World War II, Weber and Durkheim recognized that industrial society was evolving to the degree that new forms of organization/administration were needed. The decisionist model (see Figure 1) dominated, warning against over-reliance on experts and emphasizing that decisions should be framed by objectives set by politically accountable representatives, thus warning against technocracy. In this model, policy makers identified public policy and the technocrats figured out how to achieve those goals.

Post-World War II, many European countries, including the UK, adopted a technocratic science-based policy-making model (see Figure 2). A technocratic model advocates technology, in which scientists are considered free of interests and values and policies are based on 'sound science'. Hence, experts are favoured over biased politicians.

The BSE crisis in 1996 exposed science as "un-sound" and fallible and scientists not impartial; thereby, challenged the technocratic model and caused institutions involved in science-based risk policy-making to reorganize, The U.S. and other continental countries developed a new model of science and

governance, known as inverted decisionism (see Figure 3). In inverted-decisionism, policy is recognized as influenced by scientific factors together with political factors. Scientists advise policy, which is evaluated in a social, political and cultural context. Policy then informs regulatory decisions.

This model evolved into a revised inverted decisionist model (see Figure 4), also knows as the Red Book model after the recognition that science-based risk debates exist not only because of incomprehendable uncertainties which science alone cannot provide answers for but also because interests influence the scientific process. The terms risk assessment and risk management were adopted. After the BSE crisis, the UK and EU moved towards the Red Book model, but not entirely. The rhetoric was adopted but risk assessment and risk management were not separated and neither was science from policy decisions.

Van Zwanenberg and Millstone (2005) recommend a co-evolutionary model of science and policy-making (see Figure 5), in which scientific deliberations are situated in social, political and cultural contexts (elaborated on in Section 7.3).

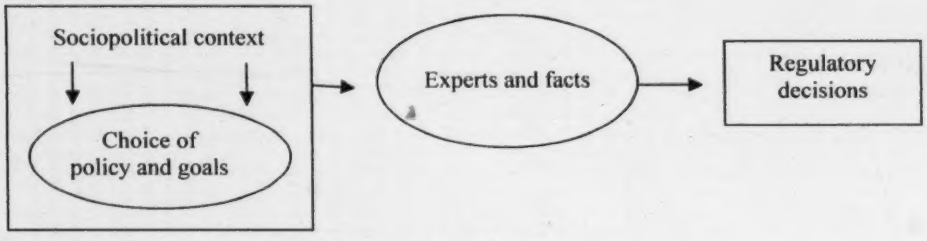

Figure 1. The Weberian decisionist model.

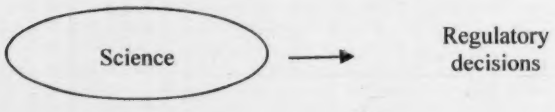

Figure 2. The technocratic model.

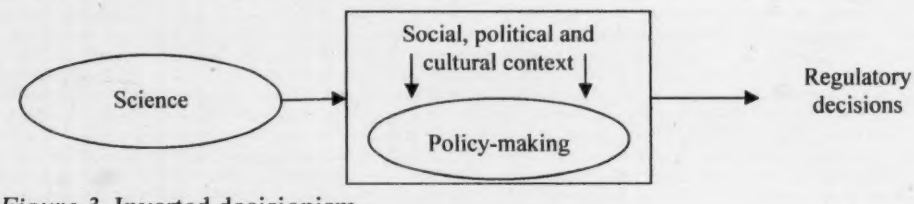

Figure 3. Inverted decisionism.

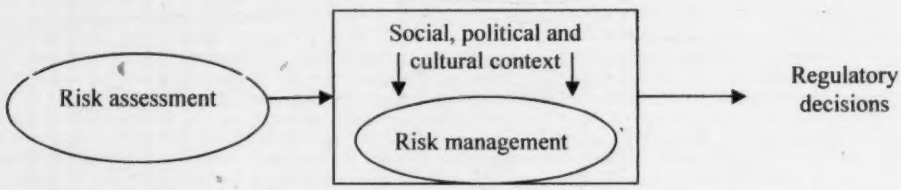

Figure 4. The revised inverted decisionist model.

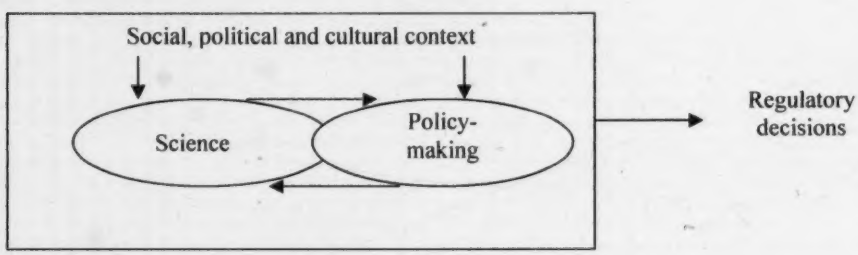

Figure 5. Co-evolutionary model.

Note. From *BSE: Risk, science and governance* by P. van Zwanenberg and E. Millstone, 2005, pp.13-29.

2.3 *BSE's Lessons Around the World*

The UK BSE crisis was scrutinized by the UK Public Inquiry, chaired by Lord Phillips and is referred to as the Phillips Inquiry. The Phillips Inquiry identified numerous problems which intensified the BSE situation but recognized that the key problem was the push for intensive agricultural production. To reduce production costs, cheap animal feeds were formulated containing high protein feeds and short cuts were made in the feed rendering and processing (Lobstein, 2001). Van Zwanenberg and Millstone argue that the Inquiry undervalued the extent and severity of the failures and fails to explain why those failures occurred:

> Since BSE represented a failure in (ostensibly) science-based policy-making, and since the ways in which the science was misunderstood and misrepresented substantially contributed to the failure, and even made the policy failure significantly worse than it might have been, the question of what went wrong, and how we can avoid repeating those mistakes, becomes especially important. (2005, p.231)

Van Zwanenberg and Millstone found that in the UK, the European commission, France and Germany the easy lessons were learned but the difficult ones—which would ensure future food crises do not occur—were not learned. One of the easy lessons is the acknowledgement that scientific as well as non-scientific factors influence the beginning stages of policy making, thus institutions have been reformed accordingly. Another easy lesson is that policy makers need both scientific and non-scientific advice. A difficult lesson not been learned is lack of recognition that non-scientific considerations influence the framing, conduct and outcome during the scientific assessment of risk. Another lesson not learned in the UK is that a technocratic approach to risk policy-making continues to be

made, rather than one which includes the public in framing key issues. In summary, many of these European countries' new rhetoric is that policy-making is now transparent and experts are independent; however, there is lack of uniformity and clarity in these statements (Ibid).

In Germany, the public perception of BSE resulted in the most expedient passage of laws in its history. The meat and bone meal feed was made illegal immediately, without first considering the costs and benefits, which is the 'iron rule' of legislation (Beck et al., 2003). Germany has also made the most exemplary learning and changes in relation to risk, the details of which will be discussed in Section 7.3. Furthermore, van Zwanenberg and Millstone (2005) found that in the European countries, none of the new institutional regimes are fully transparent or fully accountable, none involve risk assessment policy by risk managers, many policy decisions are made by appointed rather than elected officials, and none of the new regimes have to date developed and implemented fully legitimated structures and processes. Thus the conclusion cannot be made that the BSE crisis will not be repeated in the UK (Ibid).

2.4 *BSE's Impact in Canada*

Between May 2003 and December 18, 2007, eleven native cases of BSE have been found in Canada and an additional case was a Canadian-born animal found in the U.S. Six of the animals were born after the Canadian 1997 ban (CDC, 2008). Canada banned some bovine protein from bovine feed in 1997 including specified risk materials (SRM) such as brains and eyeballs which are believed to contain the highest concentration

of prions. The 1997 ban prohibited most cattle protein including SRM from cattle feed but BSE was already in the animal feed system. Moreover, blood products, gelatin, milk, and rendered fat from cattle are still allowed in cattle feed as are pig and poultry by-products, which are fed SRM cattle products (Canadian Health Coalition, 2001; Environmental Health Association of Nova Scotia [EHANS], 2001; Government of Canada, 2004; Suzuki, 2005). Cross-species transfer of the prion diseases are still not completely understood. Pigs have been infected after high oral exposure of BSE under experimental conditions and poultry could be infected because they carry a gene that is like the BSE prion gene (Kimberlin, 1996, p.170). To remove BSE more quickly from Canada, an enhanced feed ban to remove SRM from all animal feeds, pet foods and fertilizers was scheduled for July 2007 (Canadian Food Inspection Agency [CFIA], 2008). Canada did not initiate an SRM ban in human food until 2003, 14 years later than the UK (Government of Canada, 2004).

After Canada announced its first BSE case, 35 trading partners closed their borders to Canadian beef products (Charlebois, 2006). The beef cattle sector is important to both the Canadian agricultural industry and the national economy totaling 21% or $8 billion of farm cash receipts. In 2003, international trade bans resulted in a $2.5 billion decrease in national farm cash receipts from cattle and calves (Mitura & Di Piétro, 2004). In 2004, one in three Canadian farm families were estimated to operate a beef cattle farm, specifically, "a single unincorporated beef cattle farm that derives at least half of its agricultural sales from the sale of

beef cattle and calves" (Ibid). The estimated revenue loss for these farms was approximately $20,000 (or 35%) from an average total income of $60,000. The BSE had a significant impact on Alberta's farm families since approximately 42% of Canada's cows and calves are in Alberta, accounting for 56% of the value of production (Ibid).

An interesting surprise was that beef consumption in Canada rose by 5% after the BSE announcement, whereas in Britain consumption plummeted by 28% in 1990 and 40% in 1996 (Miller, 1999; Statistics Canada, 2005). This was an unprecedented and unexpected phenomenon, as beef sales in every other country would drop when BSE cases were announced.

2.5 *BSE's Lessons in Canada*

There are divergent views on whether or not Canada has learned lessons from the BSE crisis.

2.5.1 **BSE crisis as an opportunity**

The first native Canadian BSE case was "a critical turning point in the history of Alberta's livestock industry, changing it forever" (AAFRD, n.d.). The long-term effects were acknowledged to still not be fully understood and the crisis was expected to have both positive and negative effects (Ibid). Some, like the 2008 Minister of Agriculture , identified the BSE crisis as "the single largest push for positive change in our province's agricultural history. BSE showed our entire industry that we needed to do things differently to survive...that we needed to work together" (Groenveld, 2007). The Minister highlighted positive changes

such as innovation, competition, leading the way in traceability, partnerships, growing and learning. The crisis was perceived as an opportunity to tackle the two main weaknesses of the Canadian Cattle industry, dependence on cattle export and value adding by others and the concentration of the meat packing sector with two strategies: 1. Increasing packing and value-adding capacity; and 2. Harmonizing North America's sanitary standards and to use these scientific standards to regulate trade (Alberta Agriculture Research Institute [AARI], 2004; SSCAF, 2004).

2.5.2 The aim of government's response

The aim of the responses to BSE taken by the provincial government was to prevent such a disaster from reoccurring by reducing the vulnerability of the beef industry and increasing its security and stability. The government was to "create the best possible environment for farmers that will enable them to move up the value chain and retain a larger share of the profits…[and to] "create the appropriate domestic competitive tension" (Ibid, 2004, p.11). A six-point recovery plan was designed to create a more "resilient", "self-sufficient", and "diverse" livestock industry in Alberta. The six-point plan includes: 1. Increase slaughter capacity; 2. Inventory management; 3. Income support; 4. New product/market development; 5. Increase surveillance by testing high risk animals (exceeded targets of the Organisation Mondiale de la Santé Animale [OIE], which is the World Organisation for Animal Health) and constructing a prion laboratory in Edmonton; and 6. Funding research into prion-related diseases and exploring commercial uses for SRM (AAFRD, n.d).

2.5.3 Evaluation of government's response

There are numerous criticisms of the lessons outlined in this report. First, the lessons are technocratic (instrumental rationality) and does not include value rationality. Also, farmers have not been able to move up the value chain and gain a larger share of profits, in fact, they have continued to lose profits (Finlayson, 2007; Statistics Canada, 2005). Tyson Foods Inc., Cargill Foods Ltd. and XL Foods Ltd. are the three main packing companies in Canada. They are located in Alberta and have 75% of Canada's market share. Tyson and Cargill are American-owned and XL is Canadian-owned. Tyson owned Lakeside Packers in Brooks, Alberta, but sold it recently to XL (Calgary Herald, 26 June, 2008). The domestic competition has decreased as smaller packing plants have also shut down—there are now only two rather than three main markets for beef. Additionally, the plan to reduce export dependency has also failed in Alberta, as Alberta is exporting more live cattle to the U.S. than pre-BSE—export pre-BSE was 512,000 head worth $634 million whereas in 2006 export was 562,839 head worth $690 million (Pratt, 2008). Canada is close to reaching pre-BSE export levels—export in 2002 was 1.69 million head and in 2007 expected export was 1.4 million head (Statistics Canada, 2008). Also, slaughter levels were record high during 2004 and the first half of 2005 but has decreased in 2007 as the border opened to live cattle and the U.S. cattle supplies have increased (Ibid).

This case study found evidence to support the claims of 2008 Minister of Agriculture that traceability was improved, the cooperation was unprecedented,

and learning did occur; however, these aspects did not show tendencies of reflexive modernization.

The six point BSE recovery plan has been implemented and has had some mixed results as mentioned in this Section and throughout the thesis. According to the Alberta's Six Point BSE Recovery Plan brochure, "back then, we didn't have a guidebook for handling BSE. No one had one" (Ibid). The argument can be made that although Canada did not have a guidebook on BSE crisis, some lessons from the UK experience could have been applied and precautionary approaches could have been implemented earlier (AAFRD, n.d).

Charlebois' (2006) dissertation examined the impact of the environmental uncertainty during the Canadian BSE crisis and its impact on socio-political structures such as power and dependence relations as well as processes, such as cooperative and conflict relations in the beef marketing channel. Charlebois concluded that several beef industry representatives tried to decrease ambiguity, anxiety and uncertainty by normalizing the BSE event. The tendency to normalize by trying to re-establish the status quo, rather than the tendency to learning and seeking important information, resulted in a restriction of learning. Charlebois concludes that based on his research, learning did not occur during the Canadian BSE crisis. In the words of Charlebois (2006, p.155):

> The information void left by the crisis…has created agonizing uncertainty, and no will to seek more information was observed. A coordinated duel with uncertainty could have become an unprecedented situation for beef industry authorities to find a new paradigm. The industry seems to have failed to face its own weaknesses and its own limits. By caving into uncertainty and not seek important information, the industry avoided finding definition, which is essential to its evolution and ultimate sustainability….The

cattle industry was unable to absorb complex knowledge to better understand its environment.

Through written communication (14 August, 2006), the Honourable Doug Horner acknowledged the lack of documentation on how rural communities were affected by BSE. He cited the study by Broadway (2005): "The BSE issue was portrayed as a disaster with billions of dollars in lost exports; one might have expected to see its effects felt more widely. But it turns out the changes were more subtle". The Honourable Doug Horner concluded that "while the BSE crisis tested the resolve of farmers and rural communities, their response in overcoming the challenges has gone a long way towards ensuring a vibrant and sustainable future for rural Alberta"(Ibid). Furthermore, that "the impact…was softened significantly by the response of industry, the financial sector, and government" (written communication, 14 August, 2006). This case study along with other evidence (Finlayson, 2007; Mitura & Di Piétro, 2004; Pratt, 2008) has found that the beef industry in Alberta is in danger of collapsing and thus the future of rural Alberta, does not appear "vibrant or sustainable".

2.6 *Definition and Framing of Risk*

How risk is defined is determined by the process behind scientific judgments and their communication and promotion, giving insight into policy making (Miller, 1999). Science is also influenced by secrecy, public relations and mass media when defining risks. Some theorists have presented risk as unavoidable consequences of technological development, resulting in inaction or "political quietism" (Miller, 1999, p.1). Framing refers to how an issue is

represented, what information is included or excluded, what actors are associated with the issue, the aspects of events that are covered, what consequences are explored, the causes and responsibilities that are attributed and conclusions that are drawn (Bauer et al., 2007). According to Lobstein, "…framing assumptions refer to scientific considerations but are not themselves purely scientific--they reflect economic, social and political judgments" (2001, p.81). Framing assumptions (concept by Goffman 1974) are often hidden or not acknowledged. Framing assumptions about the categories of risk is one of the reasons why risk experts can arrive at different conclusions. The following categories cannot be determined solely by science: scope; regulatory institutions' research agenda (will determine evidence on which risk assessment will be made); benchmarks for measurement; definition; choice of policy options; and criteria against which policies are evaluated (Ibid). Lobstein asserts that when judgments are misrepresented as purely scientific, then framing assumptions around a problem may be incompletely examined. Moreover, individuals responsible for how assumptions are framed will not be held fully accountable.

Risk definition/framing depends on a cultural definition, which the technical approach does not acknowledge. Risks are man-made hybrids and include and combine politics, ethics, mathematics, mass media, technologies, cultural definitions and perceptions. To understand the cultural and political dynamics of the risk society these combinations cannot be separated. According to Beck, risk has become disconnected from its intentions and outcomes, as well as from instrumental rationality and control—it was supposed to produce

rationality and control (Beck & Willms, 2004). There are two stages to risk. The first stage is determinate judgment—characteristic of first modernity where risk means calculating unpredictable consequences, making the unpredictable predictable. In other words, risks that were incalculable are erroneously treated as probabilities (Ibid). The second stage is reflexive judgment—characteristic of second modernity—where risks that are incalculable are treated as such (Adam et al., 2004).

The relations of definition make clear the power relations involved in the definition of risks (Beck & Willms, 2004, p.136):

> Relations of definition include the rules, institutions and capacities that structure the identification and assessment of risks; they are the legal, epistemological and cultural matrix in which risk politics is conducted...[the] discursive, normative, and cultural features informing the political contestation surrounding knowledge of 'risks'.

Relations of definition can be determined by asking the following questions (Beck & Willms, 2004): Who decides what counts as a cause and what does not, especially when the cause is complex and therefore is insufficient knowledge?; What about when a cause cannot be determined?; What values underlie the process of dealing with a risk?; and Which interpretations of risk do those in power consider as valid?

2.7 *Scientific and Value Rationality*

Discourse on scientific and value rationality is fundamental to how western society has shaped history and will continue to shape our future. The discourse relates to the separation between nature and society which has dominated western

thinking and culture, which is being proven as a myth by global crisis. As a result, the discourse on scientific and social rationality is also at the heart of the science wars between natural and social science disciplines. The discourse also relates to the artificial divide between politics and science. Numerous scholars have engaged in the discourse on scientific and social rationality, asking questions such as: What role should science play in policy-making? What role should policy makers play? The works of Weber, Foucault and Habermas critique instrumental rationality, whereas Aristotle and others like Flyvbjerg, Nestle, and Beck emphasize value-rationality (Flyvbjerg, 2001).

Flyvbjerg (2001) referst to Aristotle when he makes the following statement: "the most important task of social and political studies was to develop society's value rationality vis-à-vis its scientific and technical rationality" (Flyvbjerg, 2001) i.e. to develop value rationality first. However, modern society has done the opposite—it has developed scientific rationality, following science like religion which it intended to conquer, resulting in a "civilization of means without ends" (Richard Livingstone in Flyvbjerg, 2001, p.53). Aristotle claimed that to balance scientific and value rationality, phronesis is needed. Phronesis does not have an equivalent word in English, but it means practical wisdom, analysis of values, and goes beyond analytical scientific knowledge (episteme) and technical knowledge or know-how (techne). According to Aristotle, a well-functioning society requires effective functioning of episteme, techne and phronesis, in other words, science, art/crafts and ethics (Ibid). Phronetic research is based on three value-rational questions: Where are we going?; Is this

desirable?; and What should be done? Phronesis must also include issues of power, which Aristotle and Gadamer left out, and asks who gains and loses, and by which mechanisms of power? (Ibid).

Modern society's imbalanced use of scientific rationality to produce technology has resulted in enormous magnitude of threats to the society. For example, science has allowed the industrialization of agriculture, resulting in uncertain threats such as BSE. Furthermore, modern society's imbalanced use of scientific rationality to understand and evaluate these risks is inadequate. Flyvbjerg (2001) and Beck (2007) both believe that developing society's rationality based principally on scientific rationality has resulted in the risk society.

Disputes about food crises have two main components, factual issues and value issues. Factual/scientific questions include: What risks are involved? How big are they? Who is at risk? On the other hand, the central value question is: Given those facts, what should society do?. In other words, "public policy choices lie at the heart of safety debates about food" (Edward Groth in Nestle, 2003, p.18).

Through numerous case studies, Nestle (2003) demonstrates how science and politics interact to influence government policies that affect nutrition and health: "food safety is political for many of the same reasons discussed in *Food Politics:* economic self interest, stakeholder differences and collision of values. At stake are issues of risk, benefit and control" (Nestle, 2003, p.x). The political aspect gives rise to the following questions: Who bears the risk of food safety

problems?; Who benefits from ignoring them?; Who makes the policy decisions?; Who controls the food supply? Since these questions are political rather than scientific questions, political answers are needed, which will depend on stakeholders' view points and interests (Nestle, 2003). Nestle (2003, p.17) describes the differences between science and value rationality in Table 1, which imply different expectations for the ways in which authorities make decisions about the safety of food.

Table 1. *Comparison of "Science-based" and "Value-based" Approaches to Evaluating the Acceptability of Food Safety Risks*

"Science-based"	"Value-based"
Counts and calculates: -cases -severity of illnesses -hospitalization -deaths -costs of risk -benefits of risk -costs of reducing the risk -balancing of risk to benefits	Assesses whether risk is: -voluntary or imposed -visible or hidden -understood or uncertain -familiar or foreign -natural or technological -controllable or uncontrollable -mild or severe -fairly or unfairly distributed
Balancing risk against *benefit and cost*	Balances risk against *dread and outrage*

Note. From *Safe Food,* by M. Nestle, 2003, p.17.

2.7.1 Science-based approaches: counting cases and costs

Scientists and officials evaluate potential risks using a formal assessment process, which includes identification and characterization of the risk, exposure in the population, and calculating the balance of risk to benefit and cost (Nestle, 2003). Science tends to minimize the subjective nature of interpretation. However, probability does not equal proof—the evidence must be interpreted and is thus based on perception, opinion and judgment. Additionally, "science and

risk assessment cannot tell us what we need to know about threats of danger since they explicitly try to exclude moral ideas about the good life" (Douglas and Wildavsky in Nestle 2003, p.20). In effect, scientific and value judgments cannot be separated. Therefore the question of how much risk, like BSE, is acceptable is not a technical one, but a social and political decision (Beck & Willms, 2004).

2.7.2 **Value-based approaches: estimating dread and outrage**

Even though scientific methods do not consider the intangible value or significance of the food we eat, when people are evaluating risks, they are not only considering potential health problems but also psychological, cultural, and social components (Nestle, 2003). In fact, "the more value-based factors characterize a particular risk, the more the risk generates feelings of anxiety, alarm, dread and outrage..." (Ibid, p.21). The public wants dread-and-outrage factors to be also considered. If officials and experts neglect these concerns as emotional, irrational, unscientific and indefensible, they may raise questions about their own credibility and competence (Ibid).

In summary, safety is relative, and the decision on the acceptable level of risk involves non-scientific and scientific considerations, as "science-based approaches are not free of values, and value-based approaches also consider science" (Nestle, 2003, p.17). From a science based perspective, BSE problems are uncertain or pose low overall risk to human health, but they rank high as causes of dread and outrage (Ibid). Van Zwanenberg and Millstone (2005) recommend a co-evolutionary model of science and policy-making (see Figure 5), in which scientific deliberations are situated in social, political and cultural

contexts. In other words, risk is represented as having both scientific and non-scientific components; thus, both scientific and value rationality are included.

2.8 *Precautionary Principle*

The two different approaches to food safety risk (science and value based) have a third component—the precautionary principle, such as testing a product first and then releasing it (Nestle, 2003). The precautionary principle states that if scientific certainty is lacking so as to make accurate risk assessment, governments should act to prioritize safety. In this case, the level of risk should be determined based on what is acceptable to society (Ibid). In the UK BSE crisis, precaution was not exercised—regulations were insufficient and inadequately implemented—rather, the public was "excessively reassured" (Lobstein, 2001). Safety reassurances prevented institutions from taking precautionary measures, such as taking beef off the menu (Lobstein, 2001; van Zwanenberg & Millstone, 2005). Consumers have difficulty assessing the BSE risk because it is invisible and global (Lobstein, 2001). In the UK case, protecting the farming industry/economics rather than consumers was prioritized. If institutions—government, corporations, science, education—consider policy based largely on ideals of economic efficiency, they are considered by Beck as morally insufficient (Johnson, 2005). Beck argues that for policy dealing with environmental and social risk to be legitimate and just, it should include in its moral foundations other values (Ibid). Lobstein argues that "consumer groups ensure that precautionary principles are at the heart of all policy measures" (2001, p.82).

2.9 *Crisis as an Opportunity for Learning and Changes*

2.9.1 **Etiology of a crisis**

As mentioned earlier, crisis can be an opportunity for. Elliott et al. (2000) refer to three phases of a crisis: 1. pre-crisis; 2. crisis event; and 3. post-crisis.

Pre-crisis is the incubation period, where core beliefs, assumptions and values direct the development and application of precautionary norms, which affect organizational activities and behaviours. There are many cues and stimuli during the incubation period which may be interpreted differently by managers, potentially leading to denial and blame later.

The second phase, crisis event, is highlighted by media. During this period there is minimal time for reflection and learning and the crisis may exceed the skills base and experience of managers. The stress creates challenges in sense-making of the problem. The crisis event involves the debriefing process. If the debriefing misses the learning opportunities and there are still hidden errors, future disasters can result: "The real solution would involve a deeper look into the causes of the crisis and how to prevent future crises" (Elliot et al., 2000, p.20).

The last phase is post crisis, which can be especially critical for learning (Elliott et al., 2000). This is when there is a "crisis of legitimation", when organizations try to secure legitimacy and trust from their stakeholders. Turner (1976) argues this phase could be an opportunity to realign institutional values and assumptions, which must be done by realigning the values and assumptions of the individuals who make up the institution. If the social construction of reality is reductionist or tainted by the powerful, learning may not occur.

2.9.2 **Criteria for learning and changes**

According to Habermas, of the three generic domains of adult learning, the most unique is perspective transformation, which can be defined as "the emancipatory process of becoming critically aware of how and why the structure of psycho-cultural assumptions has come to constrain the way we see ourselves and our relationships" (Mezirow 1981, p.6). This structure is altered to allow new experiences and understandings. In the process of transformation, adults become critically conscious through the problematization of their assumptions, social roles, expectations and habitual ways, leading to what Habermas calls emancipatory action.

What are the necessary conditions for learning? According to Elliott et al. learning must be built on openness and transparency:

> The open, transparent nature of decision-making, combined with the use of critical evaluators, can provide an organization with considerable opportunities to challenge their core assumptions, beliefs and values. From this evidence alone it is clear that culture can and does act as a powerful force upon organizational learning by inhibiting challenges to the dominant world-view (2000, p.22).

Unfortunately, values, beliefs and assumptions, which make up the culture of the institutions, are vague and intangible. Therefore, learning and prevention must be built on organized responsibility, trust and communication. Corporate responsibility can be evaluated by its communication with external groups: "identifying stakeholder interests, aspirations and potential influence is important to the learning process, as it may challenge core assumptions about what is done and how it is done" (Elliott et al., 2000, p.22). Trust can be built through public participation in the regulatory process and democratization of expertise (Jones,

2005). The concept of single and double loop learning also applies. With single-loop learning only negative feedback is considered and it is usually technical in nature. Double-loop learning includes both positive and negative feedback and usually includes technical as well as sociological components on a regular basis. In other words, learning from crisis must include both the scientific and value rationality (Beck, 2007; Elliott et. al, 2000; Flyvbjerg, 2001).

When the consequences of a risk result in an actual crisis, it can be an opportunity for learning and changes (Habermas, 1987; Elliot et al., 2000). A crisis can threaten, dislocate or destroy the existing discourse and reveal the faulty foundations of society, such as the incompleteness of its institutions. Bourdieu also asserts that in times of crisis, the habitus of social agents is dislocated from the way their life is structured. In general, habitus refers to behaviours, sentiments, competences, and ways of understanding and reasoning (Crossley, 2005, p.104). The dislocation of habitus results in an opportunity for social agents to doubt and question previously doxic assumptions and states of affairs. Doxa denotes common opinion or the view of the people and where their view stands in opposition of knowledge or episteme (Ibid). In other words, "the world loses its natural feel and at least some of what might have passed without question in the past is subject to argument and debate" (Ibid, p.69). The dominant are threatened by questioning and have to defend the beliefs and practices that sustain and justify their dominance. Learning is crucial because failure to do so "… provides fertile ground for the incubation of future crises…organizations must

learn not only from their own mistakes but also from those of others" (Elliott et al., 2000, p.21).

2.10 *Reflexive Modernization*

2.10.1 **Overview of reflexive modernization**

The beginning of the industrial revolution in the seventeenth and eighteenth centuries to the early twentieth century in Europe can be called the first (simple) modernity (Adam et al., 2004, p.223). This first phase identifies society with the nation-state in which numerous social institutions are interwoven. The survival of these institutions depends on economic security which is built by industrial regulations. Binary oppositions such as society/nature, knowledge/belief, insiders/outsiders, etc. are prevalent. During first modernity, the directions for the future involve increasing differentiation, cultivating complexity, developing more control over nature (through technological advancement), more economic growth, and more scientific research (Beck et al., 2003). Another characteristic of first modernity is that the diversity of intellectual thoughts results in unity. The first stage of modernity is characterized by determinate judgment, where the unpredictable is calculated to be predictable—the BSE case is an excellent example of this. In first modernity, the individual is reflective, presuming clearly established knowledge and certainty.

Society's transformation to second modernity is trigged by numerous changes resulting from consequences of its own making, such as globalization and ecological crisis. The second modernity will not suddenly and completely replace first modernity. The distinguishing between the two modernities is for

methodological and pragmatic reasons (Beck et al., 2003). Reflexive modernization transforms first modernity to second modernity.

In second modernity, the meaning and worth of modernization is questioned (Beck et al., 2003). Also questioned is the belief that improved and more technology, more economic growth and more scientific research as specialization is the correct solution/direction for the future. Second modernity transforms first modernity institutions, such as those of science and technology. Additionally, the diversity in thoughts do not unify but rather arguments "deepen, widen, and multiply themselves" and undermine "claims of rationality and those in control"(Beck et al., 2003, p.17). The unpredictable is not calculated to be predictable. In second modernity, the individual is reflexive. The term reflexive in reflexive modernization means a "self-confrontation" and in a risk society reflexivity translates to acknowledging the "reality-effects" of risk production and risk consumption characterized by uncertainty. Reflexivity is connected to skepticism and can open up other possible futures, directing risk society towards an alternative modernity (van Loon, 2003). During second modernity, there is no clear certainty or knowledge not because the individual lacks the capacity to understand but because the knowledge is uncertain/probabilistic, immediate and indeterminate, like BSE. There is not enough reflective distance or time since decisions must be made quickly.

Society, actors and science can transform through reflexive modernization. A reflexive society is concerned with risks' unintended consequences and their implications on society's foundations (Adam et al., 2004). In a risk society, the

reflexivity of actors is described as the degree to which actors mobilize and participate in practices that permit them to recognize the limits to their own knowledge base (Beck, Giddens & Lash, 1994). Science becomes reflexive when there's competing truth claims about risk. The public is empowered in their struggle for equality and safety when ordinary citizens are able to challenge dominant "relations of definition" (Beck, 1992; Mythen, 2004). In reflexive modernization, all facts are unveiled as choices and as normatively grounded:

> A key component of reflexive modernization is that the unquestioned basis [assumptions and criteria] of modernization is itself examined in terms of its rationality…To the extent that this erosion of the bases of certainty is publicly recognized, space is opened up for alternative forms of knowledge…the result of second-order rationalization [or reflexivity] is that there is no longer 'one best way' to solve the problem…such a loosening up of the foundations of rationality could lead to a multitude of alternative optimization strategies and/or to expansion in scientific and technical knowledge. (Beck et al., 2003, p.16)

2.10.2 **Test criteria for reflexive modernization**

As mentioned earlier, learning can occur to various degrees, including to the extent of reflexive modernization. Beck et al. (2003) outline test criteria for determining the ideal reflexive modernization to be able to distinguish between reflexive and non-reflexive social changes. The basic operational definition of reflexive modernization is that the boundaries between social spheres—society, actors, science, institutions—are multiplied or pluralized (Beck et al., 2003). According to Beck et al. (2003), the following criteria mark the shift from first to second modernity:

1. Conflicts between definition of risk put forth by scientific experts and those of political actors lead to institutional legitimation deficits by losing

trust. Legitimation deficits may change the decision-making procedures, balance opposing interests and pluralize definitions. For example, was BSE defined as an economic or human health issue? Relations of definition make clear the power relations involved in the definition of risk. Which dominant institutions' definition of BSE is being applied in society?

2. Science is recognized as having limits—to not have all the necessary information or answers—resulting in a shift from scientific rationality to value rationality. One aspect of science's limitations is that the unexpected is expected. In other words, the consequences or side-effects, that are at that point still unknown, are expected before a decision is made; thus, externalities are internalized. The conclusions of debate are reached explicitly, "but without recourse to the authority of scientific knowledge" (Beck et al., 2003, p.20). When all the scientific information is not available, there is recognition that a decision must still be made; an example of this is the precautionary principle. Was the precautionary principle applied in the Canadian BSE incidence? With the precautionary principle, the limitations and rules are determined based on a multitude of opinions, including those that vary from the dominant ones. Were alternative voices included?
3. Alternative forms of knowledge and justification are considered. The boundaries of knowledge between scientific and unscientific, between science and politics, and between experts and laymen become blurred or

redrawn. For example, work-related/laymen knowledge is as valued as expert knowledge. Science no longer has the final say. Is there evidence of different types and sources of knowledge/information? Did the evidence conflict, such as in a debate?

4. The process and restructuring of institutional decision-making changes, possibly triggered by legitimation crises. These changes include cooperative decision making involving sub-political groups and/or economics is no longer the first consideration. Additionally, whereas side-effects were politicized and driven by stakeholders' interests in first modernity, in second modernity, side-effects are the actual risks and turbulences created by the crisis. The institutional learning process can involve re-establishing old boundaries or incorporating uncertainty and insecurity. Whose interests were considered? Was there openness and transparency? What changes were made to the decision process in regulation and safety? Was there institutional reform?

2.10.3 **Sub-politics**

Part of reflexive modernization is sub-politics, which is defined by Beck as a form of politics "outside and beyond the representative institutions of the political system" (Beck et al., 1994, p.22). These groups compete for the shaping of political power. Sub-politics plays a significant role by bringing about profound social changes at levels other than on the traditional political level. Sub-political groups can mobilize for confrontation between institutions and citizen groups plus between national and local politics (Ibid). During sub-politicization,

"there are growing opportunities to have a voice and share in the arrangement of society for groups hitherto uninvolved in the substantive technification and industrialization process....[with] opportunities for courageous individuals to 'move mountains'" (Ibid, p.23).

According to Beck, sub-politics shape society from below by bringing conflict into decision-making areas which had been protected by those in power (e.g. government, private sector and science). Examples include how in the 1980's citizen groups resisted against established powers to bring awareness of environmental degradation and brought about the fall of the Berlin wall. When sub-politics begins to take effect, processes of industrialization which appeared to function smoothly and were "lubricated by consensus" (Beck et al., 1994, p.23) now meet resistance and congestion. Industrial processes previously unchecked now face "self-limitation and self-control" (Ibid, p.44). An example of sub-politics is consumer boycotts or beef producers' organizations that formed as a response to BSE.

Research on the UK BSE crisis showed that some informants, particularly the scientists, talked about risk in technical terms (or through technical rationality), therefore viewing public (and unknowingly 'expert') understanding of BSE risks as limited. However, others, particularly those from a campaigning perspective, saw risk as a broader social (or value rationality) and political concept and credited the public as seeing the "big picture" (Shaw, 1999). Groups who were concerned about the "big picture" raised alarms in the UK about inadequate policies and enforcement. Such groups need to build counter-expertise

so that organizations and individuals can challenge or participate in decision making (van Zwanenberg & Millstone, 2005). When alternative voices are excluded, policy-making institutions' risk models are constructed on limited terms and become technocratic and decisionist (Ibid). Sub-political groups as counter-experts are crucial for enabling individuals and organizations to participate in decision-making as they provide information and mobilization power. Excluding the voices of sub-political groups can be detrimental to society, as explained by Hinchliffe:

> ...exclusions that are collaboratively and dialogically performed by policy decisions and the ways in which those exclusions are, temporarily and disastrously, rendered invisible by appeals to technical rationality, material functionality and universal natural properties. The failure of those decisions to recognize the sociality of natural objects...and the spatiality and temporality of those associations, results in the intensification of risks rather than their amelioration. (2001, p.187)

Hinchliffe (2001) warns against bureaucratic and rationalist decision-making frameworks that do not address the politics behind the policies, including the precautionary principle and the planning process. He adds that "democratic forms are exclusive at the moment of inclusion...Any consensus, solution, or closure, will be an expression of a hegemony and the crystallization of power relations" (Hinchliffe, 2001, pp.186-7). A political process needs to be open to debate for democratic and accurate policy development. In other words, the exclusion of alternative voices is anti-democratic. When there is dispute between experts, mechanisms of active trust, which must be created and sustained intentionally,

proliferate (Beck et al., 2003). Institutional trust can be built by openness (Elliot et al., 2000).

Chapter 3 METHODOLOGY

3.1 *Qualitative Case Study*

This thesis engages qualitative research which in general embraces the philosophical view that "reality is constructed by individuals interacting with their social worlds" (Merriam, 1988). Qualitative research draws from phenomenological philosophy by emphasizing experience and interpretation (Ibid, p.15). A case study is an empirical inquiry that investigates a phenomenon within its real-life context (Flyvbjerg, 2001). According to Yin (2003), case studies are generalizable to theoretical propositions rather than populations or universes. In other words, a case study does not represent a sample. The goal is to expand and generalize themes (analytic generalization) rather than to calculate frequencies (statistic generalization). In other words, a single case study is chosen so that the depth of an issue can be understood rather than to discover what is generally true of many(Merriam, 1988, p.208). Furthermore, as Patton argues, qualitative research should "provide perspective rather than truth, empirical assessment of local decision makers' theories of action rather than generation and verification of universal theories, and context-bound extrapolations rather than generalizations" (1990, p.491). On the other hand, various aspects of the crisis clarified through this case study may be applicable in other contexts as well.

A case study was used because it allows for the exploration of contextual conditions, whereas a survey is constraining because it has a limited number of variables and questions that can be analyzed (Yin, 2003). The findings of a case study results in many more variables of interest than data points. Hence, a case

study relies on multiple sources of evidence such as triangulation. . According to the phenomenology of human learning, also called the Dreyfus model, the learning process needs context-dependent knowledge, which is well captured with a case study (Ibid). From an understanding and action oriented approach,

> it is often more important to clarify the deeper causes behind a given problem and its consequences than to describe the symptoms of the problem and how frequently they occur. Random samples emphasizing representativeness will seldom be able to produce this kind of insight; it is more appropriate to select a few cases chosen for their validity. (Flyvbjerg 2001, p.78)

Literary data and existing research was used to build a base for issues related to agricultural crises, BSE, learning, reflexive modernization, relevant policy and as a set-up for the research. Data was collected using a semi-structured open-ended interview approach and by reviewing literature and existing research. Literary review was used to crosscheck, frame and support or compare findings from interview data. Some key informants were already identified through the newspaper analysis and were asked if they can recommend other individuals. Also, Peace River and Alberta Agriculture Food and Rural Development officials were contacted to recommend individuals. The interview questions focused on the research objectives outlined in Section 1.3.

Reflexivity in the interview process was maintained. Respondents were contacted ahead of time to schedule interviews and were interviewed at their discretion and convenience. Interviews were audio-recorded and then transcribed. The anonymity and privacy of all respondents were assured and maintained in accordance with the ethics of the Faculty of Agriculture, Life and Environmental Sciences. Field notes from interviews were kept to add a qualitative diversity to

the interview data and support any respondents' bias. Additionally, the field notes served as a check for the researcher's biases and enabled critical self-reflection and reflexivity (Schwandt, 2001).

The researcher has followed—as much as possible during a masters level project—the principles of good social science outlined by Flyvbjerg (2001, p.137): 1. Incorporate all evidence; 2. Attend to all the major rival explanations (alternate theoreties are discussed in Section 6.5; 3. Focus on the most significant aspects; and 4. Use prior expert knowledge. Additionally, the researcher has attempted to conduct an exemplary case study, by writing a case study that has four qualities: 1. Significant in terms of theory (reflexive modernization) or practice/ policy (Alberta's beef industry is currently collapsing); 2. Complete (finished study because of enough relevant evidence rather than because ran out of time and money); 3. Considers alternative perspectives; 4. Displays sufficient evidence; and 5. Composed in an engaging manner.

3.2 *Research Sites*

3.2.1 Agriculture in Canada

Agricultural and agri-food systems include farm input market, primary agriculture, food, beverage and the sectors involved in processing, wholesale and retail (Agriculture and Agri-food Canada [AAFC], 2008). Agriculture made up 8% of the total GDP in 2005 and accounted for one in eight jobs. In 2006, Canada was the fourth-largest exporter and fifth-largest importer of agriculture and related products in the world. Over the past 15 years, internationalization of trade has increased following trade liberalization. Consumer demand has

increased for products that are diverse, convenient, healthy, have high quality and are safe. The trend is towards the concentration of farms and firms, meaning fewer and larger farms. However, demand for organic products and those produced in an environmentally conscious way have increased. Farms vary in type and scale, as well, farm incomes varies by sector, region, and type. In general, high output farms have lower cost of production per unit and gain greter support from the government through policies and programs. Government financial support for agricultural sector has increased in absolute terms but has declined as a share of GDP. For example, support was worth 40% of the sector GDP in 2006-2007. One of the concerns in Canadian agriculture is the farming population is aging; in 2006, 40% of operators were 54 years of age or older. Primary agriculture is more prevalent in the Prairies and food processing in Central and Eastern Canada (Ibid).

The farm cash receipts from cattle and calves made up 21% of Canada's total farm cash receipts. According to Statistics Canada, in 2008, there were 15.2 million cattle and calves, a decline of 4.3% from 2007 (Statistics Canada, 2008). The number of cattle have decreased on feeding operations by 12.3% due to the increase in grain prices since the summer of 2007. Since 2005, 8,500 cattle farms were lost, there are around 107,000 operations left. There are no signs of herd rebuilding.

Canada's Ministry of Agriculture is called Agriculture and Agri-food Canada. It has the following responsibilities: developing policies and programs for a secure food system and healthy environment; information source; as well as

research and technology. Its main goal is to facilitate growth and efficiency in the agriculture sector (AAFC, 2002).

The Canadian Food Inspection Agency [CFIA] is the major regulatory agency for food safety policies. The CFIA enforces regulations concerning federal food safety, animal health, and plant-protection. It inspects food plants, beef producers, and manages food safety crises. Additionally, it ensures proper labeling, humane transportation of animals, investigates and announces recalls, conducts lab tests, etc. The CFIA operates under the Ministry of Health of Canada (CFIA, 2003).

Each of Canada's 10 provinces has a provincial ministry of agriculture, which deal with policies and standards for the nutritional quality and safety of food sold in their own juridiciton. Many provinces have Beef Development Funds to support the beef industry through various projects.

3.2.2 **Alberta's economy**

Alberta is currently experiencing a boom again in the petroleum industry and currently has one of the strongest economies in Canada. The 2006 per capita GDP was $69,789, higher than all the provinces, the U.S. and one of the highest GDP's in the world. Specifically, Alberta's GDP was 56% higher than the national average (Statistics Canada, 2006). Alberta has the most economic freedom of all the provinces, meaning that it is free to produce, trade and consume goods and services (Fraser Institute, 2006). Alberta is also planning to begin building nuclear energy, locating several reactors in the Peace River area (CBC, 2008). Alberta's choice of industries indicates a high level of risk tolerance.

Alberta's largest agricultural sector is beef cattle production, making of 35% of Alberta's farm production income (or $3.1 billion in farm cash receipts annually) Alberta Beef Producers [ABP], 2008). Alberta accounts for about 40% of the cattle inventory (Statistics Canada, 2008). In 2007, Alberta federal and provincial inspected plants process about 2.2 million cattle (or 64% of Canadian total). Alberta sells 12% of its cattle within the province, 50% within the country, 30% to the U.S. and 8% to other countries (ABP, 2008). Beef production begins with cow/calf operators. Calves are typically born in the spring and are sold to Backgrounders in the fall, where they are fed high forage diets for faster fattening. The cattle are then finished in feedlots, which can range from a few hundred head to 40,000 cattle at one time. The cattle are then most likely to be processed by one of the two large processors mentioned earlier (ABP, 2008).

3.2.3 **Peace River, Alberta**

The town of Peace River is located in the north west of Alberta, along the north bank of the Peace River, approximately 500 km northwest of Edmonton and 150 km northeast of Grande Prairie. The topography of Peace River is relatively flat and characterized by boreal forests and lakes, but then drops into a stunning river valley. The area claims that an ancient Beaver Indian Legend says "Drink the water of the Peace River and you will return." The town of Peace River has a population of 6,315 (based on 2006 Census) and serves a trading area of over 15,000 people (Visitors Guide, n.d.), including the town of Grimshaw, hamlet of Brownvale and village of Berwyn. The town is bounded by M.D. of Peace No. 135, Northern Sunrise County, and the M.D. of Northern Lights No.22. The

population increased by 1.2% between 2001 and 2006. Both English and French are spoken by 14% of the population and 14% have Aboriginal status. Approximately 80% of the population is third generation Canadian and 14% of the population has a university certificate, diploma or degree. The unemployment rate is 4.8%.

The Peace River refers to its three main industries of agriculture, forestry, and oil and gas as "The Golden Triangle", oil and gas is the strongest industry (Peace River & District Chamber of Commerce, n.d.). In 1992, the mayor stated in the local newspaper, the Record-Gazette, that "agriculture is the backbone of industry here and farmers provide the biggest economic base, by far". The area is rich in natural resources, such as minerals, natural gas, oil and oil sands, timber and water. The Town of Peace River is a centre for regional transportation and distribution for industrial traffic (Alberta First, 2008). The Daishowa-Marubeni International pulp mill and Shell In-Situ plant are located in the region. The pulp mill has a history of mismanagement, conflict with the Lubicon First Nation and polluting outside regulations. With the existence of these two industries and plans for nuclear facilities in the area, the Peace region appears to have an exceptionally high level of risk tolerance.

The average income in Peace River is higher ($33,588) than the provincial average ($28,896) (based on 2006 Census). In industry, there are 3,945 experienced labourers, 18% in wholesale and retail trade, 16% in business services, 13% in manufacturing and construction, 11% work in agriculture and other resource-based industries, 11 % in health and social services, 8% in

educational services, 3% in finance and real estate. The rest (20%) are employed in other services (Ibid).

3.2.4 Agriculture in Peace River

Peace municipal district No. 135 belongs to Consolidated Census Subdivision (4819071), Division No. 19 (Census Division 4819) and Census Agricultural Region 7 (CAR 4870). The district is 26.9% economically dependent on primary agriculture. Most of the total area of the district is used for grain farming, mixed farming, game farming (elk, buffalo), cattle farming and beekeeping. There is no information available on the exact number of cows and calves in the district because of confidentiality purposes. However, according to the Veterinarian Services Incorporated data list, there are 247 beef, sheep, and hog producers in M.D. 135, of which 200 are estimated to be beef producers (personal communication, July 17, 2008). In 2001, the average cattle herd size in Peace District was 192 whereas everywhere else in Alberta it is 53 ("Managing Climate", 2007). A rough estimate is that there are 40,000 cattle (200 producers multiplied by 192 cattle) in the Peace M.D. There are between 149,610 – 349,260 cattle and calves in Division No. 19, which includes Grande Prairie County No. 1, Smoky River No. 130, Birch Hills County, Spirit River No. 133, Saddle Hills County, Fairview No. 136 and Peace No. 135 (Statistics Canada, 2006). In Peace M.D., there are 217 farms operating on 78,215 hectares and being run by 300 farm operators, with an average age of 50.0 years old. Total gross farm receipts (excluding wood) is $17,557,434 and total farm capital (market value) is $128,604,758.

Agriculture in the Peace region has been challenging for numerous reasons. The area has shorter growing seasons but fortunately longer daylight hours. Additionally, growing crops has been challenging because of acidic and heavy clay soils, forcing farmers to increase their knowledge of crops and improve crop breeds ("Managing Climate", 2007). The major crops are grass and legume seeds, as well as canola, wheat, barley, honey and horticultural crops. These crops have been customarily grown the past hundred years; however, the number of cattle has increased significantly. The land is still affordable and the weather is ideal for raising cattle. Because of environmental factors and location, farmers have had to be more progressive, including purchasing the best bulls from southern Alberta and creating hardy breeds. The cost of feeding cattle is cheaper in Peace District but transportation costs reduce profitability. The Region produces more crops and livestock than it consumes, making export an option. However, transportation is challenging because of the bridge and the loss of elevators and fuel stations. Transportation is vital to the Peace District since it is located farm from market access in the central and southern part of the province. Due to current and anticipated climatic changes, farmers in the area are already participating in educational and other opportunities to increase their profitability (Ibid).

3.3 *Sampling and Data Sources*

The following criteria were followed for recruiting participants: a) beef producer, representative of beef-related organization or business, local or provincial government representative; b) interest in participating in the research; and c) availability. Snowball sampling techniques were used to

identify respondents in this study (Walliman, 2006). The snowballing effect is when respondents are identified according to their linkages with other community members and potential relevant respondents. Thus cases of interest were identified from people who know others that were in the correct purposive target category and were information rich. Data from field interviews continued along the lines of the research questions. Twenty interviews were collected.

Ten beef producers were interviewed. The producers ranged from 46-65 years old. Most interviewed were male and their level of education ranged from grade 10 to two years of agricultural college. Interestingly, all the wives mentioned by the men had higher educational levels than they did. Most producers managed both pasture land for and crop land. Most interviewees also had shared arrangements or rented land in addition to what they owned (on average about 2000 acres). The cattle numbers ranged from 40-900 head. Amount of time running their operation ranged from a few years to over 30 years.

Of the beef producers, four belong to the Peace Country Tender Beef Co-op Ltd [PCTBC]. This group describes itself as a producer cooperative under development in north western Alberta and north eastern British Columbia. They direct market high-quality grass-fed and grain-fed, hormone-free meats produced and processed locally. The meat is provincially inspected and traceable from pasture to plate (PCTBC, 2004).

Five provincial government representatives from various departments throughout the province were interviewed. Additionally, responses were also collected from 1 local government representative and 1 local veterinarian. Further information will not be provided on these individuals in order to protect their anonymity. Three Agricultural Research and Extension Council of Alberta (ARECA) representatives also took part in this study. ARECA is a non-profit provincial association made up of producer groups (ARECA, n.d.). Their mandate is to enhance the sustainability and profitability of agriculture in Alberta. All non-producers are referred to collectively as representatives for confidentiality purposes.

The following data sources were also referenced: newspaper articles, government reports and websites, academic literature, websites of producer and non-producer organizations, audio recording of an interview with Ulrich Beck and a video by the David Suzuki Foundation.

3.4 *Research Questions*

These questions were modified or some more emphasized than others so as to incorporate or encourage emergent themes or phenomena. The overall research question was whether or not the BSE crisis served as an opportunity for learning and changes. The objectives and core research questions were as follows (also see Appendix C4):

Objectives:

1. Whether BSE was defined as a crisis at the local level;

2. The extent to which BSE crisis lead to tendencies of reflexive modernization; and
3. The relative differences in reflexive modernization tendency/resistance among the beef producers, government and other members of the beef industry.

Core research questions:

- How did the BSE outbreak in 2003 affect the Peace River community/beef producing communities in Alberta?
    - Producers: How did the BSE outbreak affect your own livestock operation?
    - Representatives: Has this event had a lasting impact on your organization? In what way?
- What actions were taken to respond to the BSE crisis?
    - Producers: Have you made any changes to your operation as a result?
    - Representatives: What steps did your organization take in response? Are you satisfied with your organizations' response?
    - Both: Would you have done anything differently?
- What do you think is the cause of recent disease outbreaks in farming, like BSE and Foot and Mouth Disease?
- Do you think scientists will be able to eventually provide solutions to such livestock diseases?

- Which experts were referred to for information on BSE? What were the information sources?
    - Producers: Do you regularly incorporate new agricultural information and technology you use?
- Which institutions have been instrumental and supportive in helping producers and organizations reach their goals?
- What can be done to better prepare the community for agricultural crisis?

Additional questions asked of producers:

1. Demographic information: age, sex and education level.
2. Description of farm, size of land, what is produced, number of livestock, and how long in production.
3. What does the future hold for your operation?
4. What are the greatest threats?
5. What are your sources of support?
6. What do you think is the role of the farmer in society? Is that changing?

Additional questions asked of representatives:

1. Are you confident your organization can prevent or at least minimize future outbreaks?

3.5 *Data Analysis*

The data was analyzed using qualitative and inductive methods. The occurrence of divergent information and opinions were also noted. Data was recorded by digital and non-digital audio recorder. For interviewees who did not feel comfortable being recorded, hand notes were written. Recorded interviews

were transcribed verbatim by a contracted transciber. The data was analysed by hand, without the use of a computer program (because it was not available). First the data was classified by conceptual categories (Miles & Huberman, 1994). Next, the conceptual categories were broken down and compared using open coding (Seale et al., 2004). Open coded themes were then analyzed and sorted for prevalence and occurrence. Further axial coding was employed to group certain responses to specific questions (those that are set under the semi-structured style). Axial coding involves procedures that reorganize data according to connections between categories in new ways after open coding. This axial coding assisted in determining categories relevant to the specific research questions and goals of the research. To further group data into themes, pattern coding formed the final step in the coding process where data linked to conceptual categories.

3.6 *Trustworthiness*

The ability to maintain a level of validity and reliability are of key importance in this type of study. There are four main criteria for ensuring quality research in conducting a case study: construct validity, internal validity, external validity and reliability (Yin, 2003).

Construct validity ensures that correct operational measures are created for the concepts being studied. The use of triangulation was foremost in this study to ensure verification of data, themes and concepts. Concepts emerging in the interviews were checked against and verified with external sources such as literature review, previous research and the data sources identified in Section 3.3. The researcher also used opportunities to enhance exposure through research

meetings, conferences or other avenues where relevant topics are discussed. In addition, significant exposure to topics and information during the graduate training ensured a significant level of familiarity with key concepts, thereby enhancing validity in the research.

The traditional understanding of internal validity is that the research findings match reality by establishing a causal relationship, whereby certain conditions are shown to lead other conditions, as distinguished from spurious relationships. Thus internal validity confirms that the research findings match reality. This case study's theoretical orientation is phenomenological, emphasizing experience and interpretation rather than reality as facts. The observations and interviews provide insight as to how people construct and interpret reality; "in this type of research it is important to understand the perspectives of those involved in the phenomenon of interest, to uncover the complexity of human behaviour in a contextual framework, and to present a holistic interpretation of what is happening" (Merriam, 1988, p. 203). Internal validity was verified using triangulation and member checks.

Construct validity and internal validity were assessed through member checks (Yin, 2003; Merriam, 1988). Due to time restrictions in the field, the researcher was not able to check entire interview interpretations with all the respondents, but member checks were conducted in four ways. Firstly, summary statements were made during the interview such as "this is what I am hearing from you…", to allow respondents to immediately make any corrections. Secondly, respondents were given the opportunity immediately after the interview

to make additional comments. Thirdly, interview summaries were written up to retain as much of the interview context as possible. Lastly, respondents were contacted when interpretations of the interviews became unclear. During fieldwork and where or if possible during analysis, preliminary findings, evolving themes and observations were checked and discussed with respondents (within the realm of ethical approval). As themes developed from interviews and observations, these were tested and discussed as questions or probes in interviews. Initial themes and/or findings were included in the reflexive interview questions and as these evolved they were especially important features for interviews with those more knowledgeable with these themes and their related topics.

External validity establishes the domain to which a study's findings can be generalized. The methods for theoretical sampling, such as choices of informants, were driven by conceptual questions rather than by a concern for representativeness. The primary concern is with the conditions under which the construct/theory operates, not with the generalization of the findings to other settings (Miles & Huberman, 1994). Thus, the issues that are extrapolated as inherent to the farming community members in the Peace region may not be true for every farming community in Alberta. Regardless of how generalizability is viewed (working hypotheses, concrete universals, naturalistic generalizations, user generalization), it can be strengthened using rich, thick description so that other researchers can determine if the findings are transferable (Merriam, 1988).

Reliability demonstrates that the operations of a study—such as the data collection procedures—can be repeated, with similar results. Reliability in

qualitative research can be problematic since is assumes "that there is a single reality and that studying it repeatedly will yield the same results" (Merriam, 1988, p.205). However, human behaviour is not static and cannot be isolated. Additionally, if a number of people experienced the same phenomenon, the observations are not necessarily more reliable. Researchers themselves can become more reliable through training and practice, stating theoretical positions and by explaining how results were arrived at. A criteria for establishing reliability is "whether the results are consistent with the data collected" (Merriam, 1988, p.206). More fitting terms are "dependability" or "consistency" (Lincoln & Guba, 1985, p.288). Triangulation was used to ensure reliability.

3.7 *Ethics*

The steps to trustworthiness are similar to the steps of building ethical research. The central tenet of ethical research is that no harm is done to the participants. To ensure this tenet is adhered to at the formal level, approvals were sought from the Agricultural, Life and Environmental Sciences Ethics Board. Participants were provided with a summary of the research, as well as details outlining participation and a written consent form (see Appendix B).

Chapter 4 RESULTS

4.1 *Effect of BSE*

4.1.1 Who was effected by the BSE crisis and how?

The Peace M.D. refers to its three main industries of agriculture, forestry, and oil and gas as "The Golden Triangle" (Peace River and District guide); oil and gas is the strongest industry. Even though agriculture is not the sole economic driver in the Peace River area, BSE hurt the local economy because producers stopped spending money. One Representative pointed out that *"for every dollar that the farmer makes, and spends, it re-circulates in the general economy seven times"*[1]. As mentioned in Section 3.2.2, farmers provide the biggest economic base in the Peace Region. Although the impacts of BSE were lessened by strong oil and gas activity, producers are *"still feeling the effects of BSE whether it's directly BSE itself or some of the side tremours"* (Representative). Others agreed that the crisis has not come to an end because *"way too many people that have incurred way too much debt"* (Representative).

The majority of respondents indicated beef producers as being the hardest hit by the BSE crisis, more specifically, the backgrounders and feedlots were first affected, then the cow-calf producers. Some producers were affected by as much as 75% less income, forcing them to exit, downsize, stop expanding, take out long-term loans and/or make other changes. The operations most affected were smaller and mid-sized producers, as well as those who had been planning to quit prior to the BSE crisis. One respondent estimated as much as 10-15% of beef

[1] Direct quotes from respondents are italicized.

ranchers will exit because of the BSE crisis, based on observations that pre-BSE there were 5 advertisements per week for farm dispersal sales and auction markets, whereas post-BSE there were 15-20 advertisements.

The age group most affected was young producers starting out their beef operations or planning to enter beef production. The BSE crisis and the *"aftermath storm"* were feared to further discourage the younger generations from farming, jeopardizing the future of agriculture and the beef industry. One Representative explained that agricultural colleges were hearing primary farmers saying "*I don't want my kid going into agriculture, there's no future*". Fears about the future of agriculture are justified, since between 1991 and 2007, the number of young farmers in Canada decreased by 62%, from 77,910 to 29,920 (National Farmers Union [NFU], 2007). The other age group most affected was producers preparing to retire—many had to use their retirement funds and/or had to delay retirement. A participant estimated that some farmers may have lost as much as half of a million dollars in cattle and land. As with other producers in Alberta, the majority of beef producers in the Peace region have off-farm jobs, mostly working in the oil and gas industry, to supplement their incomes so they can support their families and farming operations. Respondents have also observed that the BSE crisis and its subsequent consequences, such as stress and jobs away from home, have decreased the quality of family life and increased divorce. The following businesses were also affected by the BSE crisis: service industries such as machine suppliers and truckers, dairy farmers, rodeo and breeding stock dealers, secondary processors, banks, Canadian Grocers'

Association and veterinary clinics. Beef producers said all livestock operators, not just beef, were affected by BSE.

4.1.2 **Money in packers' pockets**

Tyson Foods Inc., Cargill Foods Ltd. and XL Foods Ltd. are the three main packing companies in Canada, are located in Alberta, and have 75% of the marketshare. As mentioned earlier, Tyson recently sold Lakeside Packers to XL. There are now only two major packing plants in Alberta. All producers and some representatives expressed strong negative emotions towards the packing plants (Cargill, Tyson/Lakeside and XL) for receiving *"an inordinate share"* of the government assistance money which producers thought was intended for them. The meat packers were believed to have received the money both directly and indirectly. Initially the meat packers were resistant to open their books for investigation, but eventually investigation found that the packers did indeed make a 281% profit as a result of the BSE (CBC, 2004). Specifically, Tyson/Lakeside received approximately $33 million, Cargill $9 million, 40 other companies $5 million each. In contrast, 22,000 Alberta producers were paid an average of $18,000 (CBC, 2004). The Alberta government provided direct financial assistance to the packers fall of 2003 to keep the beef industry chain going since they owned the majority of fat and market-ready cattle; thus, the feedlots were prioritized to keep the beef chain market going. In response to the criticism that packers received large financial assistance, a Representative explained that the objective was to ensure the survival of the beef industry, *"not necessarily to save all of the individuals"*. The 2003 Minister of Agriculture agreed: *"...nobody*

wants a cheque from the government, they want their cheques from the marketplace." The Minister further reasoned why the packers received money:

> *...one because some of them own cattle and they were all qualified but two because they were getting this product cheap. Packer margins aren't large...there's a reason that we don't have a lot of packers. The health standards and equipment standards are very, very high which is if you go back why we lost some small packers or mid-size packers and ended up with really virtually two large packers is because there's a huge investment and a small margin. Well what the packers had to contend with was a great deal of this animal that they could no longer handle...every part of that animal is really utilized. The old story is you sell everything but the moo.*

However, both producers and representatives believed packers received even more money indirectly by manipulating market prices *"the day programs for producers started and stopped"*. Specifically, packers reduced the prices of finished animals by as much as $200 when the financial assistance program for producers was implemented and the prices increased when the program ended. A Representative understood that packers had not made much profit the previous years but was disappointed that they did not act in the benefit of the whole beef industry:

> *...then they found themselves in a situation where they could quite easily make enormous profits and I can't blame a company for wanting to do that, but I think they lost the big picture perhaps...if they ran everybody out of business then, well, maybe that's what they're wanting, maybe they just want to own it all.*

Producers felt the government could and should have prevented the packers from manipulating prices by freezing beef prices, especially since this situation had occurred before. In the mid 1980's the beef industry was in crisis because of low prices and over-supply. The Government had over 30 programs which assisted

farmers directly. .However, when other programs were introduced, such as feed freight assistance programs for moving hay, trucking rates increased the equivalent of the farmers' subsidy. In the BSE situation, feedlots did receive money but the prices of cattle at the packing industry were altered, *"robbing"* one stakeholder to pay another. According to a Representative, history was repeating itself: *"So [the government] had experience of the past saying that if you put something into the industry as an overall package, whoever could grab the money did and it didn't end up where it belonged."*

Interestingly, only PCTBC members discussed the history of the beef industry in detail—such as its monopoly and collusion over the past 120 years—and referred to resource materials to back up their statements. Four to five companies have controlled beef prices for about 120 years, beginning with the establishment of the American Beef Pool in 1887 (Robertson, 2002). PCTBC members were not surprised that the majority of money ended up in the packers' pockets again. Although no other respondents discussed the history of the beef industry, the majority expressed antagonism towards the multinational corporations involved in beef production for their monopoly and considered it a faulty system. Although the names have changed, still only a handful of American corporations—Tyson/IBP, Swift/Con-Agra and Cargill—control the world's beef industry. Tyson and Cargill's record-breaking profits during the BSE crisis *"which brought producers to their knees"* further amplified feelings of animosity and mistrust towards the packers.

4.1.3 Lack of information and uncertainty

When the first case of BSE was announced, many respondents suspected the beef industry would experience difficulties but they were uncertain of the magnitude, as captured by the following statement: *"You know, what strikes me as odd is you know, the word crisis—I mean, it became that. I don't think anybody thought of it at the time....It kind of came on very, very gradually. It was kind of a wait and see what's going to happen"* (Representative). According to the OIE, Canada's low risk status did not change as a result of the BSE case, thus respondents' initial reactions, as captured in the following statement by a Representative, are understandable:

> *...the desperation started to come in, in terms of their financial situation...and what where they going to do. At the same time, probably [producers] felt the stress of having absolutely everything they had known, in terms of business and selling product, just completely stop and just not be there anymore. So, it's kind of like the typical grief cycle...that shock and stunned and amazement, and disbelief and denial stages they went through.*

Many were afraid Canada "*would end up like Europe—that we would find a whole bunch and that would just literally collapse the marketplace and collapse our livelihoods"* (Representative). Any optimism that the border closures and subsequent BSE crisis would be brief was short-lived, as fears of more BSE cases became a reality. When the second, third and fourth BSE cases were announced in Canada, the *"roller coaster"* began. Not knowing when conditions would improve—the lack of information and uncertainty—affected the morale of all the producers interviewed, generating feelings of powerlessness and pessimism about the future of farming: *"when you don't have knowledge of something, you're*

afraid" (Representative). Both producers and representatives noted how the uncertainty confounded their ability to make decisions and that they may have made different decisions if they had known how the BSE crisis would run its course. Numerous respondents mentioned the Canadian Beef Export Federation as propagating a false sense of security, worsening the situation.

4.1.4 BSE defined as a crisis?

The majority of respondents viewed BSE as an economic issue rather than a human or animal health risk. The 2003 Minister of Agriculture explained *"we made sure that the public understood that there wasn't a health risk in this. That people kept their confidence in the quality of our product because the quality was there"*. One participant pointed out that more people die in traffic accidents everyday than the total number of people who have died from vCJD. Another explained that the Canadian BSE is not an outbreak as only a handful of animals were affected *"this wasn't an outbreak, this was a lack of knowledge and fear that generated this and then from the American side, well it was protectionism"* (Representative). Although the PCTBC group alleged the U.S. border closed because of political rather than scientific reasons, they suspected that BSE is also a human and animal health risk. According to the PCTBC group, BSE was more prevalent than the amount identified to date and current government regulations are inadequate to prevent future BSE outbreaks since blood and other cattle parts are still fed to cattle. They also criticized enforcement as being inadequate. Referring to *Dying for a Hamburger* (Waldman & Lamb, 2004), the PCTBC

members raised concern that the majority of human deaths attributed to Alzheimer's may actually be from CJD.

These concerns mirror those of other sub-political groups such as the David Suzuki Foundation, Beyond Factory Farming Coalition, Sustainable Table, Canadian Health Coalition, Weston A. Price Foundation, National Farmers' Union, etc.. These sub-political groups perceive the BSE cases as a symptom of over-industrialized agriculture; employing unnatural practices of feeding herbivorous cattle their own by-products. These groups criticize the conditions in intensive livestock operations: high concentrations of animals, cruel animal handling, confinement, tail docking, beak clipping for birds, feed ingredients consisting of manure and other questionable materials, contamination, as well as regular use of antibiotics, growth hormones and other medications. They also advocate against the loss of small independent farms and the concentration of mega agricultural corporations. The rationalization behind intensive agriculture is believed to be economics; to make cheap food so large corporations can make more money. Only the PCTBC group tied concerns other than BSE to modern agriculture, such as growth hormones and the link to cancer, and *E. coli* poisoning. Their criticism included questioning how the downer cow with BSE, which can legally be only taken to a veterinary clinic, ended up at the slaughterhouse. However, despite criticisms of the Canadian system, they felt Canada had less diseased animals than the U.S.

What made BSE a crisis in Canada was not just the trade borders closing but also the timing when BSE hit; the cattle cycle was expected to peak around 2003 and there was an excess supply of cattle:

> *[The cattle cycle has peaks and lows] and it's very consistent...and very few other influences can affect it. BSE was one of those influences that was able to affect the cattle market....because of the timing of the BSE with cattle cycle, it produced the crisis, I think, maybe more so than anything else...* (Representative)

BSE had a broad effect not just on the beef industry, but also the entire agricultural industry:

> *People realized that [food safety and environmental regulation] were never going to be the same, they're going to be changed and some of the changes really had no bearing on BSE but they were brought about, stimulated, because of the BSE that brought the other changes...and so from that standpoint BSE probably had a big, big effect on the industry...* (Representative)

A different view was that BSE should be kept in perspective in relation to other diseases: *"Although BSE is a sensational disease and an economic disease, I think our time is better spent addressing the diseases that have way more repercussions for us, for example E. coli, TB, anthrax, salmonella"* (Representative). Many participants felt that Foot and Mouth Disease is a much greater threat as it is very contagious and can be spread easily and rapidly, unlike BSE. Canada did have FMD in the early 1950's and killed thousands and thousands of cattle.

One Representative, saw the BSE crisis as an opportunity for change:

> [To] *put a lot of pieces together. And we pulled together...it was bizarre, so many things. But it's not bizarre if you think holistically, largely surprise, surprise, your time has come. And part of that was because I believe holistic thinking IS the answer, I wasn't surprised*

to find a lot of things we were doing could GIVE the answer. And so in some ways you could say we were visionary...

4.1.5 Problems in agriculture post-BSE

Even though countries have re-opened their borders to Canadian beef, producers are still feeling the lingering impacts of the BSE crisis. Some producers said the beef prices are still not what they were pre-BSE and that Canada still does not have all its markets back. The majority of respondents felt that the effects of the BSE crisis are still being felt:

> *"We should not have been so optimistic in the resolution...I don't think we recognized the fallout or the backlash long-term."* (Representative)

> *"We'll just limp through it, we'll close our eyes, pretend its not happening, and it's going to go away. It's NOT going away."* (Representative)

> *"[BSE has] been a sensational disease, it's been a political disease. But the sensationalism is gone, the politicians have kind of left us and agriculture is left to try and pick up the pieces to try to get re-established."* (Representative)

Numerous interviewees believed that the situation is worse now than during BSE, that *"BSE is nothing compared to what is going on now"* (PCTBC). One respondent explained that at least BSE had a "*finite solution*", such as reducing the number of BSE incidences through regulation and having the borders eventually open again. In contrast, the problems four years after the announcement of the first case of BSE do not have finite solutions and producers have found themselves in the *"perfect storm"*. The Canadian dollar had reached a record high. Grain prices also reached a record high due to anticipations of the biofuel industry, raising the cost of feeding cattle. The price of inputs such as

fertilizer, pesticides, fuel and building supplies continued to climb. The shortage of labour and high labour wages due to the oil industry boom in Alberta further exacerbated the crisis of not only beef producers but also beef packers and other sectors of the Canadian agriculture industry (Finlayson, 2007). As summarized by a Producer, *"Alberta has been too prosperous for agriculture, we've had all the prosperity agriculture can handle...agriculture prices are not following".* Additionally, the requirement of many cow/calf producers to repay overpayments based on cow-herd inventory values made during BSE by the CAIS program extended the time and severity of losses, creating an extended hardship on beef producers.

With numerous agricultural crisis, producers explained what has been especially difficult is that *"the breadth of these costs are being borne by the producer and there has not been much compensation from the rest of society".* Additionally, changes in environmental regulation, food safety, etc. financially affect producers but they often do not get financial return from making the required amendments. Although some producers felt that society should share the burden of farmers, some did not agree: *"We chose to be farmers so we have to live with the possibility that crisis can occur at any time, we can't blame anyone but ourselves for being farmers"* (Producer).

When asked if BSE has had a lasting impact on their organization, representatives acknowledged the difficulty of being able to judge whether there have been lasting impacts and what they were because of the multitude of factors involved. On a government level, BSE pushed disease response. The crisis

forced government to be "*more ready to act and plan ahead for larger crises*" (Representative). Some suggested at the citizen level, people have more confidence that government believes agriculture is important, thus conflicting with the view of some producers that the government did not provide enough support to show it believes agriculture is important. At the farmer level, a Representative noted that producer attendance at the Forage Association workshops and meetings on sustainable farming (financially and environmentally) has increased since BSE. A historical view was that FMD in Canada during the 1950s took 15 years to recover and "*government thought at the time, oh, this is only a short term things and it's going to go away. It hasn't gone away yet. It's only gotten worse*" (Representative). Therefore it would not be a surprise if the consequences of BSE continued to have an impact on the agriculture sector.

4.1.6 **Problems in agriculture pre-BSE**

Numerous participants pointed out that Alberta's agriculture, governance in the Department of Agriculture and the beef industry were not heading in a "*good direction*" even before BSE. The analogy used was a frog in slowly heating water. Alberta suffered from crop disease (*Fusarium*) in 2000 and a massive drought in 2001 and 2002. In 1993, District Agriculturalists and Home Economists (also referred to as Extension Agents of Alberta Agriculture) jobs were replaced with specialist roles and resulted in many staff leaving. Farmers' needs were now left to be presented by Forage Associations and Applied Research Associations. Forage and Applied Researcher staff are employed by their producer boards and their duties consist of field experiments, demonstrations

and extensions. The veterinary research laboratory in Fairview was also shut down. Additionally, in 2002, Alberta Agriculture shut down 50 offices that had been working with producers on a one-on-one basis and removed on-ground field workers who specialized in economics, crops, livestock, etc., thus Alberta Agriculture *"lost some effectiveness"*. Furthermore, prior to BSE, there was an over-supply of pork and chicken and the U.S. market for beef was insufficient.

All respondents found the oligopsony in Alberta's beef market problematic. The lack of options for producers has created dependency. The lack of access to small packing facilities has also made it difficult to direct market to customers who require customized cuts. Prior to the Free Trade Agreement, the Canadian beef packing industry was almost 100% Canadian-owned (NFU, 2007). As of 2007, Canadian owned plants process less than 30% of Canada's beef. Additionally, the price of a cow has decreased 31% while the price of hamburger has increased 71% (Ibid). All respondents except PCTBC members discussed the loss of family and smaller scale viable farms and the rise in large corporate farms as inevitable, adding that crises like BSE speed up such changes.

4.2 *Actions Taken as a Response to the BSE Crisis*

4.2.1 **Producers' actions as a response to BSE**

The limits of producers' capacity for agency in response to the crisis is captured in the following statement: *"They can't change the price of the product that they're selling, they can't change the prices of products they're using, so they have to be more efficient with what they do"* (Representative).

Producers made the following changes at the farm level:

1. Technology: Some producers downgraded their equipment and adopted less technological and more traditional farming techniques or shared equipment. A Representatives observed financially-desperate farmers "*looking for the magic bullet*", such as buying equipment promised to have higher efficiency, which may have cost them more in the end.
2. Feeding practices: Feeding practices were modified by allowing cattle to go to their food source rather than bringing them feed, which reduced equipment and fossil fuel use. Examples included swath and bale grazing or grazing annual and perennial residual material on fields, as well as reducing feed costs by using residues from the grain industry. One producer couple said they continued to feed protein supplements after the British BSE because they did not think it would become a Canadian problem. Not all producers interviewed fed regulation-approved protein supplements to their cattle. Some grew their own crops for feed, thus the feed did not contain animal proteins. The PCTBC group and two other producers clearly stated they do not feed animal-containing feed. However, for those that fed regulation-approved protein supplements prior to BSE, none stopped feeding them post-BSE. Feed will be further discussed in Section 4.3.1 and 5.1.2. One of the concerns for producers offering grass-fed or grain-fed beef only, as opposed to regular protein-supplemented beef, was that consumers would get suspicious about conventional meat.

3. Animal husbandry: A Representative witnessed producers cut corners in the wrong places, such as not using vaccines or insecticides or by reducing supplements and compromising the productivity or health of future off-spring. This issue of farmers bearing the costs of crisis and consequently taking actions which may unknowingly create possible future risks is further discussed in Section 4.3.3.
4. Change location: Whereas some producers had previously sent cattle for fattening to the U.S. prior to the border closure or to southern Alberta, the BSE situation resulted in producers fattening their cattle locally, as Peace River grows an abundance of grain. Some producers shipped their cattle for fattening and slaughter to the U.S. once the borders opened for live cattle. Other producers reduced their number of cattle and turned pasture land into crops, as crops were catching higher prices.
5. Marketing: In Alberta, numerous groups emerged as wanting to have their own brand, slaughter plant, and/or direct market beef to consumers or retailers, including PCTBC and Peace Country Premium Beef (PCPB) in Peace M.D. Unfortunately, like most producer groups in Alberta, both Peace producer groups were unsuccessful. Respondents mentioned the following failure factors: lack of resources or skills to work with customers and/or retailers; inaccurately calculating the cost of production; lack of cooperation from needed sources; difficulties dealing with management/middle-man for retailing; and/or lack of transparency higher up in the beef chain.

6. Herd management: Producers sold younger animals including replacement heifers, which received a higher price than older animals. Seeing aged and non-prime cattle in addition to longer calving seasons had a negative psychological component on several producers. Producers were also forced to keep animals longer and accept longer calving seasons, increasing production costs. In contrast, since the price of cattle was low, some producers steadily increased their herd size in anticipation of future market upswing. These upswings have not yet occurred and some producers are now selling these purchased cows and their base herds.
7. Calving: Some producers switched from winter to spring calving to cut costs and to reduce market saturation.

When producers were asked if they would have done anything differently, they provided the following responses: sell to smaller rather than larger retailers; find more export markets outside of the U.S.; and choose a different middle-man but not necessarily cut out the middle-man position as it was challenging to talk directly to retailers.

4.2.2 Representatives' actions as a response to BSE

Representatives mentioned the following actions taken at the government level, most of which were focused on the producer:

1. Programs and workshops: Programs and workshops in various government departments were created to assist producers in cutting costs, such as pregnancy checking without a veterinarian, calculating pound rations to reduce feed, decreasing farm size, and becoming more business savvy.

Marketing components were also taught on topics such as understanding contracts, futures and hedging options and managing business cash flow. In addition to marketing, the local Forage or Applied Research Association put on workshops about farm food safety and the Environmental Farm Plan.

2. Financial assistance: Packers, feedlots and producers received $402 million in direct financial assistance in 2004. The CAIS program also provided indirect payments to producers based on lack of income and falling inventory values, but producers are now having to repay some of those funds. As mentioned earlier, a large portion of the money ended up in the packers' pockets, either directly or indirectly.
3. More value-adding and processing: The government provided funding to open more packing plants or to increase existing plants' capacities, especially for processing cattle 30 months and over, such as Heart Valley Processors, Ranchers' Beef, Lacombe processing plant and Peace Country Premium Beef (PCPB) producer group (to be distinguished from PCTBC).
4. Market diversification: Alberta Agriculture found different markets for excess Canadian beef. Some packing plants stored beef or delayed marketing cattle. Programs were created to assist producers in developing niche markets or direct marketing.

5. Lobbying: During the BSE crisis, the Peace M.D. mayor attended meetings regularly to show support for Alberta beef, as did the 2003 Minister of Agriculture and other government officials.
6. Cooperation: The Alberta government worked with affected industry partners and the federal government, creating partnerships through the Alberta Beef Industry Strategic Framework (ABISF). The ABISF outlined key focuses at the level of government, extension and industry. Discussions on testing and international requirements were challenging because of different interests and competition. The media was briefed about the unfolding of the BSE situation on a daily basis. The Minister emphasized to the media that the Canadian BSE was different from that in the U.K. because SRM had been banned in Canada since 1997 and thus less BSE cases were expected. The Minister of Agriculture's key message was to instill confidence in consumers.
7. Other: The local veterinarian held information sessions for producers and also spoke on the radio. He also strongly supported 100% testing in the Peace region to create a brand. The local grocery chain store began carrying beef produced in Peace region.

The responses of representatives were mixed when they were asked if they were satisfied with how their organization responded and if they would have taken different steps. A reoccurring comment was that everyone tried to make the best decision they could with the information they had at the time. The mix in

responses is further detailed in the sections on success indicators and alternative actions:

Success indicators:

- Boxed beef was crossing the U.S. border 3-4 months after the closure.
- Testing facilities were expanded with the goal to test enough animals to restore confidence to the marketplace.
- Canadians' beef consumption increased after the BSE announcement, rather than decreased.
- BSE was dealt with on a scientific basis.
- Canada succeeded in changing OIE's rules.
- Alberta was made the centre of prion research.
- Equipment was upgraded even in smaller abattoirs, allowing local facilities to capture the benefits.
- Producers received financial assistance.
- Lobbying with the Alberta Beef Producers was more successful than if the government had lobbied alone, because "*people in Alberta Agriculture are not on the ground and do not have a good idea of what goes on day to day [on the farm]*" (Representative).
- Alberta Agriculture staff were able to provide assistance to producers with marketing and plans for building packing plants.

Alternative actions proposed:

Government

- Not changed government and ministers in the middle of the BSE crisis.

- Government could have looked at alternative solutions if they had examined the BSE problem from a systems-perspective rather than focusing on a "*narrow minded agenda*" of value adding.
- More grassroots rather than top-down solutions; allow government/extension staff to provide more feedback and be part of decision-making as well as figuring out more practical solutions.

Communication

- ABP representatives could have communicated better with communities to facilitate understanding of what their goals were.
- Communication between the beef corporations and the producers could have been improved.
- More information about cattle identification and cattle tag equipment to producers could have been communicated.

4.3 *Cause of BSE*

Producers were more likely to believe feeding prion-infected feed caused BSE but also that it was normal/expected: *"something you get"*, *"our turn"*, *"spontaneous"* and/or *"genetic"*. Representatives' responses for the cause were more fairly distributed between prion-infected feed, normal/expected, and other countries. Other countries included Britain and international traffic due to globalization. Some did not consider the BSE announcements as an increase or an outbreak, but that Canada has always had BSE and scientists are only now identifying it and/ or because surveillance and testing has improved and increased.

4.3.1 Feed as the cause of BSE

Participants who were uncertain that animal protein is the cause of the BSE crisis made comments that BSE has always been around and they are *"not sure there is a true cause...should not be feeding ruminant to ruminant but I don't think anyone else figured that one out either"* (Representative). Of the respondents who believed feeding animals to herbivores was the cause, a portion pointed to infected feed from England, rather than infected feed in Canada. As expressed by one Producer:

> *I don't think I worried about it too much to start with. I don't think I knew very much about BSE at the time really. It had been a British thing in the news and we certainly heard about it there and just kind of hoped it would stay on that side of the ocean... I think we assumed up until that particular day that we were safe. So it takes a while before you know or learn about the disease itself a lot. Maybe then after you think well gee, we've been feeding this stuff and oh!*

A proportion of producers that were previously trusting indicated they were now more questioning about feed, as expressed in the following statement:

> *...feeding of animal byproducts, you certainly begin to think about that. Question that. I didn't really have any concern with it before. I thought a protein source was a protein source in a way. You go for the cheapest sources probably you begin to question that certainly now.*

One Producer exclaimed: *"It's common sense not to feed animals to animals"*. The PCTBC group stated that scientists need to stop feeding animals to animals rather than continuing to study the problem. Numerous producers clarified that ruminant protein feed is not manufactured by farmers and that farmers trusted the scientists to develop safe protein feed and for manufacturers to provide safe feed:

> *...like blood meal and stuff like that...I don't think they knew there was a big risk as there was...and we didn't pay particular attention*

to ingredients, because you don't think they're a problem and you also kind of trust that the people who are manufacturing them, you know, have the information that...to not put in stuff that would be a problem. But I guess if nobody knows it is a problem at the time, well...and another thing they should have known because in England they knew right away. And it should have been common knowledge that, okay, now we are not going to put those risk materials in our feed. Get them out, now. But that didn't happen here. It took them quite a while to get that done. (Producer)

The PCTBC group specifically pointed out that the ingredients are not always clear, as sometimes they are in either Latin or *"mislabeled"*. For example, chicken feather meal is not just chicken feathers but also chicken *"guts"*. Numerous producers questioned why feed still contains blood, then answered themselves *"it's economics"*. The issue of economics is discussed further in Section 6.3. Despite producers questioning the feed, as mentioned earlier, producers who had fed regulation-approved supplements prior to BSE continued to do so post BSE. Numerous producers contended that economics has forced them to feed ruminants regulation-approved protein feed because it is cheap and aids in finishing cattle faster, thus increasing their low profit margins. The 2003 Minister of Agriculture stated that producers did not cause the BSE crisis.

4.3.2 Regulations as the cause of BSE

Other than PCTBC, one other Producer and one Representative mentioned that the SRM ban should have been implemented earlier. Both producers and representatives questioned if regulations are adequate to prevent future BSE cases:

"...it's a lack of controls over the years, lack of understanding of what could happen..." (Representative)

> *"[It's feed related but] I think there are other areas that we are missing."* (Representative)

> *"...there probably were some mistakes made with animal parts still remaining in the system. I wonder if there's more to it than that though too. And I don't know if science has uncovered all the answers yet."* (Representative)

> *"...not too sure if they've got a good handle on taking all risk material out of all the feed..."* (Producer)

Suspicions were also raised about the feed company Ridley *"restructuring and re-diversifying or changing ownership to limit their exposure"* (Representative). Ridley was targeted by the CFIA as a possible source of feed contamination.

4.3.3 Intensive agriculture and cheap food as the cause of BSE

Other than the PCTBC group, two representatives briefly questioned intensive agricultural practices, as demonstrated in the following statements:

> *"And BSE. It's definitely opened up questions; whether it's brought about answers yet, I don't know. It certainly has people questioning whether this is the way we should be doing it."* (Representative)

> *"...the drive for low cost and cheap food it comes with a cost - having every bit of food available whenever you want – it comes with a cost."* (Representative)

Only one Representative critiqued the beef industry from a broader perspective, discussing numerous issues and suggested *"to deal with the problem and not the symptoms of the problem...getting to the root of that problem"*. The root of the problem of BSE, as identified by the Phillips Inquiry (Lobstein, 2001) is the push for cheap meat, which includes feeding herbivores animal byproducts. Both producers and representatives problematized the push for cheap meat and moreover cheap food. Farmers are subsidizing food with money out of their own

pockets. Consumers not willing to pay for the real cost of food was also raised as degrading the future of agriculture. Respondents commented that imported food is cheap now, but the price of food will eventually increase, especially as corporations gain greater control of food.

It is dangerous for society to allow producers to bear the majority of costs of production because it may lead them to contribute to future agricultural crises. As producers' profit margins decrease, they will attempt to cut more corners, such as not vaccinating or providing nutritional supplements (Lobstein, 2001). With regards to BSE or possibly other animal diseases, producers may not take corrective action, as described by a Representative: *"...people won't if they feel they have a problem—tell nobody. That'll probably be the biggest thing. You know, they're going to do like Mr. Klein and say shoot shovel and shut up... people will be more afraid to bring it up which is actually maybe worse to the industry overall".*

4.4 *Science for Solutions?*

Representatives were more likely than producers to indicate that not even scientists fully understand or agree on what prions are. Despite this response, the majority of producers and representatives were confident or hoped that scientists would be able to provide solutions to BSE and other livestock diseases. However, those that were confident scientists can provide solutions said risks can be minimized and mitigated but not all diseases can be eradicated—there will always be emerging diseases. Some were not sure if eradicating all risks was even

important. Additionally, many emphasized that diseases other than BSE should be focused on.

An additional comment was the food production system cannot be sterilized. Scientists were seen as needing both financial support and cooperation from industry in order to succeed. A Representative emphasized that science in agriculture needs to be more valued. A third of respondents acknowledged there is more than science to dealing with and solving livestock diseases. For example, it is important to communicate to people about what the risks are. Most respondents had high respect for scientists and scientific integrity and believed that science was important, especially during crises. One Representative discussed the importance of having research and crisis-response independent of industry's interests. The PCTBC group also discussed stakeholder interests contaminating science, mirroring concerns of other sub-political groups:

> *And the use of science in all aspects of food production, the use of science, they have created an impression that the science is exact, the science is right and the science indicates that BSE is not really that big of a problem, right? That you don't need to do the testing...But they constantly do use science to manipulate the public and create a false impression on the public that their food is safe...The corporations use science to manipulate the public. Unfortunately, as the public, we tend to trust people in those roles because we think that they are telling us the truth.*

The PCTBC group explained how three scientists from Health Canada were fired for whistleblowing. Specifically, Ms. Haydon had found BSE in a six month old cow, published her findings and was fired. She also suspected that the calf got BSE through the milk supplement, which is made from cow's blood. Blood circulates through the entire system of an animal, therefore she suspected

that removal of just the SRM may be inadequate to prevent BSE. Whistleblowers are discussed in detail in Section 5.2. PCTBC further questioned the integrity of scientists: *"But if the prions are in the blood, does not blood flow through the entire animal? So are not our scientists, in a sense, lying to us, creating a false sense of security when it's not there. So, they do use science in their favour and they hide behind it."*

4.5 *Experts and Information Sources*

4.5.1 Government and veterinarians

When asked about which experts were referred to for information on BSE, representatives were more likely than beef producers to rely on experts working for the government, mostly Alberta Agriculture and the CFIA, as well as experts from Europe or other international experts. One Representative said his department relied on international experts in terms of control and testing, because "*those are probably a lot more along the scientific side. We scoured the world globally for those answers*". Only Representatives indicated they relied on experts from the federal government, such as Agriculture Canada and the CFIA. An individual pointed out that most of the information that comes from the CFIA is from the laboratory located in Edmonton. Alberta Agriculture was the most relied on, including their own department experts such as provincial veterinarians, the statistics department and Ropin' the Web website. A Producer said he often relied on the Ropin' the Web website for information "*because the people that are putting that in there are generally well qualified*". Alberta Agriculture also developed their own publications and had extensive inside communication within

the department, "*the Alberta Government informed their staff well at what was happening...So we ourselves were very well informed I believe within our government circle. Federally again, I think it would have to be back to websites and everything*" (Representative). Only the mayor of Peace River indicated using the AUMA and AAMDC as an information source.

The second most common expert sources for both groups were for veterinarians from all levels—international, national, provincial and local. Both representatives and producers relied on a local Peace River veterinarian, Dr. Kevin Breker, for information on BSE. He supported BSE testing 100% of cattle in Peace River and to have their own brand, "*Dr. Breker was on the right track...unfortunately the federal government was totally inflexible...which it did not have to be...it had more to do with just enormous political pressures from the States and Canada trying to work with them*". The other most commonly relied on veterinarian was Dr. Gerald Ollis, who was described by one producer as a "*cool head*", adding, "*I always felt if he said this was to be believed and people like that*". A couple of producers expressed trusting the veterinarians since they are scientists rather than the politicians: "*Head vets—I put my faith in them. How do you know when a politician is lying? His lips are moving.*"

Two representatives and only producers of PCTBC used expert information from the UK universities' and government's websites on BSE. Information was sought on how to deal with policy, regulation and control, and feed-related issues. Canadian universities and colleges were also relied on for

expert information on BSE by two representatives and by one producer with a degree in agriculture who had worked for the government.

4.5.2 **Media**

Producers were most likely to rely on news sources such as newspapers (both local and non-local) as well as TV, and other farmers either by word of mouth or conversations. None of the representatives, except the mayor of Peace River, indicated media as a general source of information. Nevertheless, some representatives working for Alberta Agriculture worked with the media to direct information everyday as the 2003 BSE crisis was unfolding. Interviewees praised Alberta Agriculture's *"consistent and accurate"* messages sent through the media.

4.5.3 **Others**

Representatives dealing with funding programs relied on statisticians, people with experience exporting to the U.S., and owners/managers of large feedlots who work with packers. The local Veterinarian also relied on the company producing the BSE testing kits. The PCTBC group trusted only a handful of expert and information sources, as they believed *"experts are told what to say"*. The PCTBC group referred to for information from "*behind the scenes*" received from political groups they were aligned with. These sources included the University of Manchester from the UK, National Farmers' Union, David Suzuki Foundation. They also referred to the books *Dying for a Hamburger* (Waldman

& Lamb, 2004) and *Past, Present and How We Can Survive for the Future in the Beef Cattle Business* (Roberts, 2002).

The Peace Country Beef and Forage Association and SARDA were also acknowledged as having specialists, but mostly on creating profits with pasture management rather than BSE itself. Only one Representative mentioned the USDA and the Beef Information Centre as a source of expert information and did not specify details. The ABP was praised by numerous participants for doing an excellent job, as described by a Representative: *"ABP, out of any of the organizations that I heard of, probably presented the information that was the easiest to understand just because they themselves are producers, they know what's happening on the farm and they know what's going on there and they're able to relay it very well."* One Producer used the Western Origin Beef Committee, which includes experts from university, government, and industry to make policies. A Representative cited using the CBEF initially, *"but then got tired of their propaganda because they continued to say everything was fine and it was not"*.

4.5.4 **Information sources not trusted**

A variety of information sources were not trusted. The first was the internet, other than the websites mentioned earlier, *"since anyone can post a website…if you are going to base your decision on it, there needs to be some criteria sorting and some evaluation of the source"* (Producer). Paid consultants were found not trustworthy because they were *"not considered the most*

responsible in terms of depth of analysis or depth of information, nor were one-off think tanks because they often did not get the whole picture" (Representative).

4.6 *New Technology and Information*

The majority of producers said they regularly incorporate new technology and information into their operation to cut costs by changing grazing methods, using ear tags for tracing and participating in cattle efficiency trials. Some said they do incorporate new technology and information sometimes but not as often as they do to grain production because there is just less new technology and information in beef production, as well as less financial returns. Reasons provided by producers who did not regularly incorporate new technology and information included waiting to see if others were successful or not affording it.

When producers were asked about their information sources for new agricultural information and technology, the results were interesting to contrast to the question about which experts were relied on for BSE information. For agricultural and technology information, government source was still the highest, specifically Alberta Agriculture and the Forage and Applied Research Associations. This was also the case when asked about information on BSE. The second highest response was other farmers. The third highest response was farming magazines and rural newspapers. Surprisingly, farm supply dealerships only accounted for one producer's response.

4.7 *Instrumental Role Played by Institutions*

When asked which institutions were instrumental and supportive in helping producers and organizations reach their goals, government at all levels was cited most often by both producers and representatives. Producer-related organizations and academia were the next choices for both groups.

4.7.1 **Federal, provincial and local government**

According to the 2003 Minister of Agriculture, the federal and provincial government worked with the industry to devise an exit strategy for the short, medium and long-term and this level of cooperation was unprecedented, especially since many of the players were competitors. Numerous respondents acknowledged that either or both the federal and provincial governments were trying to be supportive in helping producers with subsidies and other aspects, including support for one of the Peace producer-groups wanting to direct market and some funding for smaller packing plants. However, many also criticized the governments that "*they did not do enough or in the right way*". The Canadian Agricultural Income Stabilization (CAIS) Program is one of the supports offered by the federal government to producers during crises to "*smooth out a bump*". Then again, BSE was more than a bump, it was a *"washout"*. Although CAIS provided some financial aid, the application process was too convoluted for producers and some felt it was just a *"band-aid solution"*. The suggested alternative to CAIS was to have a base value program for producers similar to that in Quebec. Additionally, many producers preferred a good and fair market

over government handouts, which the 2003 Minister of Agriculture recognized (see Section 4.1.2 for direct quote).

The Provincial Government's initial agenda for the future was based on the conditions in 2002 but was radically altered when BSE arrived. The Government was critiqued by a Representative for not systematically thinking through and dealing with the changes from a systems perspective:

> *They didn't realize that there is a system that needs to be put together, not just a one trick pony...They just continued on their way of visioning that is was going to be economies of scale, the larger commodity based, it was going to be value added - and I have no problems with value added, I think it's very important. But I think the fact is [Government] didn't realize that producers now do not have the equity... They're bleeding badly and you've got to realize that you can't be working on the future without dealing with the present 'cause the present is a catastrophe. And they chose not to go there...the leadership from...two individuals [in Alberta Agriculture] pushed the future entirely and ignored that a moving freight train had just hit [producers] and they refused to recognize that fact...[Government] just left it up to another group to deal with subsidies and CAIS and trying to do their way and that was very misguided. They needed to work together. They needed to be a team and step back...to deal with the future but not lose sight of the present because it is dramatically different in one year than it was before. The beef industry part.*

The Provincial Government was also criticized by many for shutting down the Department of Agriculture in Peace River and the veterinary laboratory in Fairview, as expressed by a local politician:

> *Contrary to what's needed in that regard, in this region, when [the Provincial Government] is talking about regionalizing some of their departments and offices, regionalizing means centralizing to me...drawing these offices away from us. That's centralizing, not regionalizing. So I really do believe what we've got to get back to having people in the field in the area – that can help. And unfortunately we seem to be going the other way.*

Some interviewees were specific about which level or section of government was helpful. Alberta Agriculture was the most commended for doing "*an amazing job*" and having a *"pretty good crisis plan"*, including programs to fund producers and some meat processing plants. Some considered only certain departments of Alberta Agriculture helpful because "*higher up in the chain the logic is missing*". A further explanation of this comment was expressed by several respondents; as government workers became more removed from the *"field"* and from an understanding of what works on a practical level, the less helpful their suggestions became. Additionally, representatives who wanted to try alternative solutions were excluded (see Section 5.2). Another problem was that some policies were regarded as not being producer-friendly, which is problematic because "*without your goose you're not going to get your golden egg*".

The CFIA was cited by participants as being "*definitely necessary*", while numerous individuals were critical that the CFIA was not helpful and created barriers to actualizing plans of building a processing plant as well as creating a 100% BSE tested beef brand. For example, in the process of a group of producers trying to market their own beef, the CFIA would inhibit a step without giving reasons, "*so then you had to try and figure out why or prod somebody*" (PCTBC). Additionally, the CFIA had an inflexible *"stone wall mandate"* (Representative). The structure of the CFIA was critiqued for having too many administrators and not enough field workers. Furthermore, rules made in Ottawa are often challenging to apply locally. Their financial management was

also questioned. SRM disposal was considered a problem because there were no proper sites available. In addition, if producers needed to have post mortem testing done on an animal, they required permits to take them to SRM sites, but the permitting authorities are not accessible. One Representative expressed his frustration in the following words:

> *So we are doing all of these things, which are expensive, cost millions of dollars to do, and yet really are serving no purpose. I mean, the purpose may be that we are going to have a government, maybe we'll have better acceptability on an international market, and if that's the case, then okay that's not a bad reason to do that. But to spend those millions of dollars on something and to try and implement something, is an administrative idea but not a practical idea.*

The Provincial and Federal Government had limitations as to what they could accomplish. Unless the U.S., Japan and Korea changed their mind or adjusted what could be exported, the beef industry "*is like a moth flying into a candle. There was only a little bit that you could do to avoid the flame but you were going there*" (Representative). The Representative further explained that the Alberta Government, or specifically his department, could not influence the market enough in Canada or internationally to resolve the problem, "*we just didn't have the political, economic or social impact to do that*". The Federal Government did not get an "*excellent mark*" because of inadequate recognition of farm costs and farming needs, as well as because "*the feds just didn't seem to think that [BSE] was that big of a deal*" (Representative). A few producers mentioned that they did not know exactly what actions the Provincial and Federal Government took, demonstrating the importance of communication.

The local Peace River MLA was praised for taking producers' BSE-related issues to the Provincial Government. The local government "*did all did what they could, and with care*". Governments of surrounding counties were also acknowledged for being helpful, although no specifics were provided. The mayor at the time went to meetings to support producers, as did the AUMA. Otherwise, the local government was not asked to assist producers, although they did put some money towards agriculture in the area.

4.7.2 **Producer groups**

Agricultural Research and Extension Council of Alberta (ARECA) is an umbrella group made up of 16 Forage and Applied Research Associations around the province, including the Peace Country Beef and Forage Association (PCBFA). Producers make up the ARECA board. ARECA staff were referred to by respondents as "*the grassroots people*" and were considered very instrumental in aiding farmers, especially in undertaking projects. PCBFA filters agricultural information for farmers and focuses on profitability. The experimental work of the PCBFA influenced producers' thinking, including net feed efficiency trials. The Smoky Applied Research and Demonstration Association (SARDA), also part of ARECA, assisted the PCBFA in extension activities, such as hosting and organizing different speakers, organizing labour and ideas. The Alberta Environmentally Sustainable Agriculture (AESA) was also noted as being instrumental. These extension staff were more instrumental than meat packer members *"who acted on their own behalf"* (Representative).

The Alberta Beef Producers' (ABP) Association received praise from both producers and government representatives for the following reasons: disseminating information, effective public relations, working to find a solution to BSE by lobbying, providing suggestions on producer assistance programs, asking the Provincial and Federal Government to be involved. A Producer commented: "*they have cool heads in their [ABP] executive that did not panic...trying to look after things and talk to the Americans and deal with the science part of it and play down the fear mongering*". The Alberta Cattle Feeders Association (ACFA) worked through the ABP and represented the feedlot industry, providing input and encouraging the government to get involved. The Canadian Cattlemen's Association (CCA) was mentioned in general and more specifically, sending lobbyists to Ottawa and Washington. The Beef Information Centre (BIC) is the beef marketing division of the CCA. BIC is governed by a committee of cattle producers who are elected and represent over 90,000 Canadian beef producers. BIC was involved in the Alberta Beef Industry Strategic Framework discussion to create policies, bringing a retail and consumer focus. They launched a number of programs to deal with beef over 30 months of age, including encouraging customers and restaurants to incorporate beef from older animals into their meals.

4.7.3 Academia

As mentioned earlier, academia was also considered instrumental to producers and organizations for reaching their goals. Some respondents mentioned universities in general, while others specified the research programs

at the University of Alberta and the University of Calgary for conducting *"pure, basic research"*. The Olds College was also noted as being supportive. They were also praised for training the next generation "*to run the [agricultural] industry*". The criticism of academia was similar to that of government workers at higher levels—being impractical or unrealistic.

4.7.4 **Media**

The agriculture media was also instrumental because they were connected to rural communities and *"took the time to get the stories right"*. Whereas the national media was about the image, sensationalism and national ratings, the local media was about the people, process and solutions. The local media had to also keep up ratings "*but there is still that connection about helping the local people understand the local issue*" (Representative).

4.7.5 **Business**

Businesses that were mentioned as being instrumental included the UFA Co-operative Ltd. in Grande Prairie and other cooperatives who invited speakers, nutritionists and people to conduct demonstrations of fencing or other farming products.

4.7.6 **Non-supportive institutions**

Many criticized the CFIA as being non-supportive because of its opposition to BSE testing and creating other obstacles. Interestingly, mostly the PCTBC group listed other non-supportive institutions:

> *[Most organizations have been set up to] create the illusion of solving problems...[and] aiding all of the ranchers in this crisis...the whole thing is just to make the public believe that everything is okay. There has never been any interest in actually helping solve the true problems, it's just to maintain the profits for larger companies.*

The PCTBC group based their perceptions on their experiences while trying to set up their own beef brand and processing facility. They described local governments and towns in the Peace Country area to be supportive by giving money and suggestions but found that the higher level governments created adversity. For example, one of the municipal governments initially agreed to provide assistance but then were *"blackmailed"* by the Provincial Government and had to withdraw their support. The group felt hindered by all levels of government: *"I don't trust the government. To me they are mafia—just like the big packing plants"*. Another reason why this group did not trust government and large beef businesses was because *"companies buy out medium to large operations and then use government regulation influence on legislation to drive out the rest"*. The group also mistrusted the ABP and CCA, proclaiming that they *"do not support farmer but rather big business"*. The group also lacked support from other producers, who did not believe they would succeed in their beef marketing plan. However, if the group did succeed, those same producers wanted "*to be the first ones there*".

4.8 *Perceptions of the Beef Industry and Safety Regulation*

Table 2 summarizes responses about how perceptions have changed about the beef industry and safety regulation. The responses are elaborated on either in the previous or following sections.

Table 2. *Changes in Perceptions of the Beef Industry and Safety Regulation*

Perceptions Improved	Perceptions Deteriorated
GOVERNMENT (Federal and Provincial) -Some financial support to producers -Coordinated cooperation between all beef industry players -Ability to convince the media and consumers that Canadian beef is safe	**GOVERNMENT (Federal and Provincial)** - Disaster assistance program too convoluted for producers -Gave most of the assistance money to meat packing plants -Rather than government handouts, create competitive market conditions -Alberta Agriculture was downsized, decreasing its effectiveness
CFIA -Impressive ability to trace BSE infected animals to source -Plays an important role in ensuring food safety -Importance of safety regulations and traceability	**CFIA** -CFIA created obstacles for producers wanting to niche market -Extra safety regulations helped multinational corporations; however, the cost was suffered by the producers and did not benefit them directly - Should have learned from the UK BSE experience and banned specified risk materials in the 1980's rather than 2003
BEEF INDUSTRY -Abattoirs were upgraded to ensure higher level of safety -Confidence in the integrity of the Canadian beef industry in terms of safety and ability to deal with crises increased	**BEEF INDUSTRY** -Vulnerability in the world market, relied too heavily on the U.S. market -Confidence in the future of the beef industry decreased -Power of the packing plants over government, suspicions of manipulating the market for their own benefit
ABP -Provided important information to both producers and consumers -Lobbied the U.S. to open the border	**ABP** -Strongly influenced by the packing plants
SCIENTISTS -Confidence in their ability to provide solutions to prion diseases	**SCIENTISTS** -No consensus on what prions are and how they should be dealt with -Since prion diseases are relatively rare, should prioritize more common threats

4.9 *Prepare for Agricultural Crisis*

4.9.1 Plans and programs

When asked what could be done to better prepare communities for agricultural crises, the most frequent suggestions by both government representatives and producers were plans and programs, including rules and protocols for prevention, such as not importing diseases. Income stabilization programs at times of crises were also recommended. Specifically, income

programs should be more defined during crisis to ensure producers rather than packers receive the money. If a financial assistance program *"is aimed at dealing with a social crisis, deal with it that way, don't make it an agricultural production program"* (Representative). Additionally, assistance should be given *"without strings attached"*. The already-existing program of purchasing infected herds by the Federal Government was acknowledged. Suggestions were made to have base value programs, such as the one in Québec, which guarantees producers enough payment to make a living. In general, world forces and climatic forces were identified as causing long-term shifts, which cannot be predicted or controlled, thus cycles of good and bad times were expected.

4.9.2 **Government cooperation**

There were varying opinions from representatives as to which level of government –federal, provincial or local—should bear the responsibility of agricultural crises. Additionally, more cooperation between the different levels of government was emphasized. Community was also considered as playing an important role during agricultural crises, involving the local chamber of commerce, infrastructure support (e.g. food bank) and religious organizations.

4.9.3 **Education**

Education and information that was not industry-biased was also considered beneficial to prepare for agricultural crises. Education made a difference because producers who were better educated were able to source more resources and

information and were better able to analyze them. A Representative explains in detail:

> *Some of the strategies that of course worked better than others were the people that knew their costs of production and everything realized how quickly how much money they were losing and potentially the financial devastation that was occurring around them. And so they tried their best to do mitigating things as quickly as possible and make good decisions as quickly as possible BEFORE they had the full impact and then the people that didn't keep those financial records weren't as knowledgeable about the costs of production simply...it hit them now more so in ways that I don't know how they're going to mitigate the damages 'cause the damages have occurred. And so it's after the fact when you can do less about it.*

Education was also seen as a way to empower producers to manage their own risks rather than sending them government cheques to farmers. It is important to note that some producers who only had a high school education or less still accessed academic and other higher-level information.

4.9.4 **Structural changes**

Some also suggested a move towards diversification, local economies rather than economies of scale and to have more small-scale processing plants. Traceability was suggested as a preventative measure. Emphasis was placed on solutions to come not just from the top-down but also from the grassroots, such as from the farming community and producer organizations such as ARECA. A Representative suggested that the BSE experience has better prepared producers for future agricultural crises because of some of the alternative thinking and techniques they learned about.

4.10 *Additional Questions*

4.10.1 **Additional questions asked of producers:**

Future of farming operations; The majority of producers expressed pessimism, concern, and uncertainty as to the future of their beef operation. Most producers' children did not see a future in farming and were not planning to take over the farm operations. The producers understood their children's choices, as they did not want their future to be full of hardship. Producers also felt a lack of control since they cannot control the biological life cycle of cattle and can only make changes in feed and other management aspects. The PCTBC group explained: *"But we are so pushed against the wall, the only way I think we can see a future is to actually learn how to subsidize ourselves."* When producers were asked what they perceive as the greatest short and long term threats to their operation, 50% responded new government regulations, including the extra costs incurred by producers. The issue of new regulations will be discussed in Section 6.3. Another 50% believed the greatest threats were the lack of competition in the beef industry, multinationals lobbying power and the declining number of provincial processing facilities. Other threats mentioned were high dollar and feed prices, low cattle prices, disease, old age, weather and agricultural swings.

Sources of support: For main sources of support, half of producers indicated other producers and the farming community. One Producer felt the farming community in his area was "*one of the tightest communities I have ever*

seen because many generations have stayed in the community and got along. Feuds like in other places are unheard of here." Producer organizations such as PCBFA, ABP, CCA, and ACA were also supportive.

Role of farmer: The role of the farmer was seen by some respondents as putting food on the table while others felt the role of farmer is no different from that of urbanites, such as participating in their community. Producers emphasized that children and consumers need to be educated about the crucial role of the farmer. Society's view of farming is also changing—farming is being viewed as a business rather than a necessity. For those producers who said their role is changing, they referred to becoming more environmentally friendly and more integrated into society. The concern that corporate farms are driven more by profits than family farms was also raised and that food prices need to increase so that farmers can survive.

4.10.2 **Additional questions asked of representatives**

The question to representatives regarding their confidence that their organization can prevent or at least minimize future BSE outbreaks did not pertain to most, as it was not in their capacity to prevent or minimize future outbreaks. The question was slightly modified to include the organizations of government, beef industry, and/or scientists. Representatives believed the veterinary surveillance programs improved food safety, animal testing improved, the CFIA and CCA reduced the BSE risk with the feed ban (despite its controversy of costs) along with stricter protocols and regulations. Additionally, future outbreaks could be prevented or minimized with proper

material handling, using the best equipment, and working with the best scientists. After the BSE crisis, the Alberta government set up the Alberta Prion Research Institute and PrioNet, attracting high calibre scientists and supporting prion-related research. The relationships built during the BSE crisis between government departments as well as the government and the ABP were also indicated to assist in preventing or minimizing future outbreaks.

Chapter 5 ANALYSIS

5.1 *Learning and Changes*

As described in the Literature Review, van Zwanenberg and Millstone (2005) found that the conclusion cannot be made that the BSE crisis will not be repeated in the UK. Also, Charlebois (2006) found that learning did not occur during the Canadian BSE crisis. Does this conclusion also apply for this case study? Or have learning and changes occurred as a result of the crisis among the key players? Have learning and changes occurred to the extent of reflexive modernization, as based on Beck's test criteria, to ensure that the BSE crisis will not be repeated?

5.1.1 **Science and politics**

All participants indicated the BSE crisis had brought issues to their attention of which they were previously unaware. This included the science and the politics of BSE. Representatives, more so than producers, mentioned learning more about the beef industry in terms of how it functions, including the negative aspects such as power imbalances. Respondents were also surprised by the vulnerability of the Canadian beef industry. As detailed in Table 2, perceptions of the beef industry and safety regulations both improved and deteriorated. Some producers said the crisis made them realize how much they did not know before

and *"how many people are behind the scenes on a regular basis ensuring everything is flowing smoothly"* (Producer).

Representatives learned about responding to disease-related crises, the importance of openness, the need to act quickly and decisively *"and not worry about offending someone"* (Representative). The BSE crisis was perceived by some as having positive impact because it encouraged producers and industry to accept government rules and regulations more.

Another positive aspect was that BSE brought some awareness of industries' shortcomings, such as the importance of proper injection, cattle handling procedures to reduce bruising, and prevention of manure contamination: *"Yeah, these are things that as an industry we need to police ourselves and definitely BSE might have made some awareness but we definitely, definitely need more"* (Representative). However, others commented that although the beef industry may be more diligent about animal diseases, regulations and food safety, the *"industry is out of step with a globally competitive market"*. In other words, extra regulations cost money, thus the Canadian beef industry is not as competitive as countries with fewer standards or lower costs of production.

The BSE crisis also highlighted relationships. Cooperative and productive relationships were developed between key players in the industry and government as well as between government departments. Some felt the beef industry, as a whole, *"does not work together until there is crisis, but then it can do a good job"* and the amount of cooperation was unprecedented. Some critiqued that stakeholders *"could have worked together quicker and less adversarial, more of a*

win-win approach". The BSE crisis also highlighted negative aspects, such as lack of relationships and cooperation. For example, foreign animal diseases are a federal responsibility but *"they may or not appreciate the depth that it impacts particular areas".* Another example is the challenge for science and government to work together. Science was perceived by some as *"cut and dry, there is a hypothesis that is tested and proven".* In contrast, government considers the science but then also has to consider *"those consequences left, right and centre".* Additionally, a political favour may have to be fulfilled. The science indicated that Canadian beef export should continue after the first Canadian BSE case but countries like the U.S. were perceived to have shut the border for political reasons. A lack of cooperation was also noted among western producers by the PCTBC group:

> *It's all social conditioning. In the West we are socially conditioned that....well, the first lie we believe is that our neighbours are competitive and our neighbours also are enemies...Then we believe in this lie of free market, this open market is the way to go. And so we believe too many lies, whereas the Québecers have come together and it's different propaganda they have been exposed to. It's not just Québec. Ontario is more market-board driven than the West is at this point.*

The lack of cooperation between producers and other beef industry players is not new and has been documented before; producers are independent and proud and the beef industry is extremely competitive because of low profit margins (Charlebois, 2006; Epp & Whitson, 2001).

5.1.2 Learning and changes among the key players

As mentioned in Section 2.10.3, sub-political/consumer groups play an important role in ensuring that precautionary principles are at the centre of policy procedures (Lobstein, 2001). Sub-political groups often have a broader perspective on issues than politicians or scientists, who have their own interests. Sub-political groups can provide counter-expertise and thus can make valuable contributions to policy-making (van Zwanenberg & Millstone, 2005). Concerned with food safety, these groups also bring question and bring awareness about stakeholders' self-interests, imbalances in power, and collusion (Nestle, 2003). The promise of safety can prevent the questioning of whether a product is needed or wanted (van Zwanenberg & Millstone, 2005). Are there participants in this case study who exhibited tendencies towards reflexive modernization and could be categorized as sub-political?

The Alberta Beef Producers' Association and Canadian Cattlemen's Association changed their role by lobbying, promoting beef as safe and marketing. They also changed how they spend check-off dollars. Both organizations altered their mandate to better serve their members. Also, they became more open and responsive to public perception. The Beef Information Centre became more self-critical and concentrated their programs differently. The Canadian Cattle Identification Agency pushed for better tagging system, contributing to better health prevention. The Canadian Beef Export Federation realized they had relied too heavily on U.S. markets, therefore they re-evaluated alternate products, found different markets and changed number of cattle

slaughtered therefore changing the type of meat Canadian customers were receiving (high quality cuts were shipped to the U.S.). The meat packing plants upgraded their equipment and became more compliant with regulations. In summary, the learning and changes of these organizations do not incorporate uncertainty or alternative knowledge, or exhibit institutional reform to the degree of reflexive modernization.

There was a mix of responses on the tendency for the Provincial Government for learning and changes. Some interviewees said there were no change at all. Others listed the government's activities, such as lobbying and helping producers who wanted to make change and become more independent. As described in Section 2.5, Canada had identified numerous lessons from the BSE crisis. However, the lessons focus mostly on value-adding and technocratic solutions, which ignores the systematic problems in the beef industry and therefore tendencies of reflexive modernization were not exhibited. The plans to increase market competitiveness have failed as the number of packing plants has decreased since 2003. Additionally, the plan to reduce export dependency has also not been successful in Alberta, as Alberta is exporting more live cattle to the U.S. than pre-BSE and Canada is increasingly closer to reaching pre-BSE export levels (as mentioned in section 2.5.1). Among the representatives, some briefly questioned intensive agricultural practices but only one of them can be categorized as sub-political. This sub-political Representative identified internal problems in the agriculture department and emphasized the need to find the root of problems in the beef industry rather than just fixing the symptoms. He

believed *"holistic thinking IS the best answer for long term agriculture and society sustainability"*. He recognized that simply looking at value-adding and finding new export markets was insufficient to bring about change that would prevent future food-related agricultural crises and to improve the situation of farmers. The systems thinking between either of these end points needs to be in balance.

CFIA was the government branch who made the most amount of changes, becoming more alert and improving traceability protocols. Again, these changes are technocratic and not to the degree of reflexive modernization. Others were critical of the government's slow response and argued the CFIA should have banned SRM long before 1997 by having learned from the UK experience. Additionally, that the feed ban should have had more strict enforcement, as new BSE cases are being blamed on an ineffective feed ban (Pratt, 2008).

Some producers saw the BSE crisis as an opportunity for learning and changes while others did not, as expressed by a Representative: *"some people just simply accepted the inevitable and did little about it. Others adopted change and embraced it and tried to deal with it..."*. Many producers realized *"if I keep on doing what I've done in the past, I'm not going to be here in five years time. And that realization is there in the industry"* (Representative). Also, the crisis sharpened producers' business sense:

> *...the astuteness of these people as businessmen has definitely increased since BSE has hit, there were a lot of sharp guys even before it hit, but I think the level that they're performing at is so much higher than it was five years ago. The other side of the coin is*

they had to rely on themselves a lot more to do little things. (Representative)

Producers who began thinking of the entire beef system also attempted to gain greater control of their operations and livelihoods by trying different actions. Producers who viewed the crisis as an opportunity

> *... are going to be better prepared because some of the alternatives that they went to during BSE allowed for them to learn and crisis is a good learning opportunity if you want to learn from it and I think so any people were pushed out of their comfort zone so they did...* (Representative).

The previous statement about being pushed out of one's comfort zone ties directly to Bourdieu's theory of habitus and doxic assumptions being dislocated and questioned during a crisis. As shown by the results of this thesis, many producers' perceptions of various institutions, the beef industry, safety regulation, feed, intensive agriculture did change, as did their production practices. Albeit feed was questioned, those who previously fed regulation-approved feed continued to do so even though it still contained cattle blood and other by-products which sub-political groups question. Therefore the learning and changes among the majority of producers was not to the extent of reflexive modernization. The same conclusion is expressed in the following statements:

> *Now whether it's going to change, I can't say for sure. I think people are very content to take the easy route when it comes to doing things, you know, so if it's just easy to take their older cows to market and they get sold to the States, that's what they'd continue doing...I think it'll take industry leaders such as governments or somebody, a council like the ABP, to make changes like that, to pursue other marketing avenues. As opposed to just individual farmers. Because it's a very complicated process when you're going to deal with export markets, especially with the cattle industry...With cattle there's [very few marketing boards],*

like all we do is we take it to the auction marts, we have a few to choose from, or private sales...From a producer level that's all we do and then it's up to the feedlots and up to the multinationals like Cargill to continue the marketing. I think from a producer level, not a lot will change on the marketing end. (Representative)

I don't think that as a group BSE taught us very much except [beef producers] are now quite a cynical group and what used to hold promise doesn't hold promise for them anymore. (Representative)

Members of the PCTBC group were the only ones who consistently challenged the dominant discourse, including issues around modern intensive agricultural practices such as hormones, contamination and feeding practices. Only they mentioned that chicken by-products are still being fed to cattle and then cattle are being fed back to chickens. As mentioned in the Literature Review, poultry might be experimentally susceptible to high parental doses of BSE because they carry a PRP-like gene (Kimberlin, 1996). The PCTBC group also had a broader scope which included the history of the cattle industry and relational aspects such as questioning politics and science. The PCTBC group's perceptions mirrored that of sub-political groups (listed in Section 4.1.4), which advocate for sustainable agriculture and humane animal handling practices, therefore they can be categorized as a sub-political group. Furthermore, the PCTBC group was the only one who mentioned being part of the National Farmers' Union. The National Farmers' Union intervened in the Federal Court case which appealed the reprimanding and gag order of the former Health Canada scientist Dr. Haydon (EHANS, 2001). The sub-political members appear to have been reflexive prior to the BSE crisis and around issues broader than BSE; in some instances, even broader than just agriculture. In other words, BSE was a discussion point rather than a trigger for reflexivity.

As mentioned in the Literature Review, appeals to technical rationality can result in the exclusion of alternative voices, thereby ignoring social or value-rational aspects of problems. PCTBC's perspective encompassed value rationality and also scientific rationality (outlined in Table 1) as they communicated the following points: feed ingredients are often unclear and still contain questionable ingredients therefore the risk in feed is imposed; there are hidden BSE risks due to inadequate regulation and enforcement; there is uncertainty around the risk of BSE as the science is incomplete; the risk is mostly human-made rather than natural; and the risks are unfairly distributed. The spatial and temporal associations which can lead to the intensification of risks include the human errors made on the various levels of beef production, such as the farm, feedlot, feed processing, transportation and meat processing. Indeed errors have been made at these levels and new cases of BSE have resulted (Pratt, 2008).

Both PCTBC group and the sub-political Representative claimed they had been excluded from the political arena. For example, one level of government would offer a specific support, but then would withdraw that support because of pressure from higher level government-this occurred on numerous occasions. The producer group also felt exclusion from other producers, as mentioned earlier about their lack of support for their projects. More specific details will not be provided in order to protect the anonymity of the interviewees. According to PCTBC, the Federal Government called them *"radicals"* because they do not follow the rules and they were excluded from receiving assistance in their plans to set up a processing plant. The PCTBC group declared that they are *"not trying to*

be malicious" but the *"average farmer does not know the truth"*. The sub-political Representative was one of very few civil servants who had a systems-perspective and was told he did not fit the plans of the government and was also excluded. He also revealed that the leadership in Alberta Agriculture managers and directors had shifted *"such that their staff largely had no say and no opportunity to give feedback, to be part of the decision making process"*. He added:

> *...there were so many good people that could have done things and were not permitted to. And we saw that, and that's part of I guess as we move more and more to fewer and fewer having greater power, that's a weakness. Because if those people are visionary, are the right people, that's wonderful. But if they're not, it's horrendous.* (Representative)

Indeed, as Hinchliffe (2001) had warned, the exclusion of the sub-political voices did crystallize power relations and allow normalization, as none of the other respondents learned or made changes to the degree of reflexive modernization. Alarmingly, it is those who view the beef industry from a broader perspective and are attempting to make innovative changes that are being excluded and/or forced to leave: the agents of change are forsaking the field of agriculture.

Consumers were believed to have also learned from the crisis, in terms of how the beef industry functions and by becoming more conscious about food safety. The sub-political Representative believed that consumers also wanted to get more control back and moved toward organic, because *"if [safety regulations are] going to go wrong, it's probably less going to go wrong from the organic standpoint or it can go wrong from a more typical commodity type standpoint"*.

5.2 *Power*

Learning also took place around power. Participants were astonished about the influence of the OIE, the media, and other countries. The power of Cargill and Tyson was also exposed, *"price collusion, greed, capitalism, and seeing the true weaknesses in the beef industry at its worst [they] now have realized how they can exercise some of this control are never going to go truly back to not"* (Representative). In contrast, the lack of power of politicians and the ABP Association was mentioned. Some interpreted the Federal Government's lack of willingness to push for more testing as *"playing along with the U.S."* (Representative). Some guessed there may be other reasons as to why government did not do more, one suspicion being that government is controlled by *"big business"*. Numerous individuals recognized that beef industry stakeholders influence political decision-making. As mentioned earlier, respondents' comments included the need for unbiased information, the separation of science from industry, and that the packing plants should not be part of the ABP Association.

The results of this research reveal an imbalance in power structures and its consequences for learning and changes during the BSE crisis. As mentioned earlier, Alberta has two main packers left, the American-owned Cargill, and the Canadian-owned XL, creating an oligopsony. The rules are unfair in the beef industry and have created dependency; power and dependence are inseparable (Charlebois, 2006). Criticism is mounting on the vertical integration of not just the beef or Canadian food system, but also the world's food system, where a

handful of mega-corporations are controlling every aspect of food production (Goodman & Redclift, 1991; Halweil, 2004; Hendrickson & Heffernan, 2002; Kimbrell, 2002; Marsden, 2004; McMichael, 2000; Nestle, 2003; Schlosser, 2002;).

Charlebois (2006) argues that to be empowered, producers need to become price providers. However, producers cannot become price providers, in direct marketing for example, if the power structure excludes them and when there are too many obstacles. This research has shown that numerous obstacles existed for producers during the BSE crisis when they attempted to take agency and make changes by direct marketing, creating their own beef brand or setting up small-scale independent abattoirs.

5.3 *Policy*

How policy objectives and options are articulated will determine the scope of scientific deliberations (van Zwanenberg & Millstone, 2005). The context of scientific deliberations about risks are influenced by the following factors, whether they are included or excluded, accepted or discounted, revealed or concealed (van Zwanenberg & Millstone 2005): experts, questions, research topics, scientific claims, data, interpretations, uncertainties or data gaps. Decisions on these factors determine which policies are endorsed and which are undermined. Nestle (2003) also showed that science and politics interact to influence government policies that affect nutrition and health. Since many questions around food safety are political rather than scientific, stakeholders' perspectives/ interests or their value-rationality must be considered. Table 3

summarizes how sub-political and non-sub-political groups interviewed evaluated the BSE crisis based on value-rationality questions (Flyvbjerg, 2001).

Table 3. *Evaluation of the BSE Crisis Based on Value-Rationality*

Value-rationality questions	**Non sub-political responses**	**Sub-political responses**
Where are we going?	Intensive agriculture	Intensive agriculture
Is this desirable?	Yes or if not desirable, the direction cannot be stopped	No, attempts are made at creating alternative solutions
What should be done?	Better regulation (scientific-rationality approach)	Make system-wide changes (scientific and value rationality approach)
Who gains? Who loses?	Gain: everybody, including those in power	Gain: those in power Lose: those not in power
Which mechanisms of power exist?	Overt	Hidden as well as through exclusion

Canada's BSE policies were not based on *"we don't know what BSE really is"* although many of the respondents felt that scientists do not fully understand BSE. Respondents also proposed that there is more than science to solving the BSE problem. Results of this case study show that certain experts, such as Dr. Haydon and other representatives, were excluded, as were uncertainties around temporal and spatial associations which have lead to more BSE cases. The precautionary principle was not applied in time or adequately, modern agricultural production methods and cattle feeding practices were not questioned by producers, or if they were, no changes in feeding were made. The feed ban has been ineffective as at least half of the twelve Canadian BSE cases (includes the case found in the U.S.) so far were born after the 1997 feed ban (CDC, 2008; Pratt, 2008). Results also show that producers feel they have borne the burden of the food safety problems and the packers, who control the food supply, have benefited.

5.4 *Applying the Criteria for Reflexive Modernization*

The following points are a summary of Beck's criteria for testing reflexive modernization, as described in Section 2.10.2. These criteria are applied to this case study.

1. Definition/framing of BSE crisis: safe, normalization, relations of definition;
2. Science has limits: precautionary principle;
3. Knowledge: alternative voices, debate and questioning; and
4. Institutional decision-making: stakeholders' interests, openness/ transparency/ denial and regulation, safety.

5.4.1 **Definition**

Definition/Framing—Safe

- Canada framed the BSE crisis solely as an economic issue. The majority of respondents mirrored this, with no mention of animal or human health concern expect by the sub-political producer group.
- The Canadian government and the CFIA have stated that Canada's beef is safe even though it can expect one BSE case every two years for the next ten years (CDC, 2008). The majority of respondents believed that Canadian beef is safe, even if there were some flaws in the regulations. The sub-political producer group believed there are more BSE cases undetected and regulation is inadequate. They had a broader perspective by viewing BSE as a symptom of a flawed agricultural model and also raised concerns of other food risks.

Definition—Normalization

- The Canadian BSE was normalized based on the majority of responses of beef producers and representatives. Many believed that BSE is perhaps normal. Some did not consider the BSE announcements as an increase or an outbreak for the following reasons: 1. Canada has always had BSE and scientists are only now identifying it; and 2. Surveillance and testing has improved and increased the number of BSE findings. The finding of normalization is also supported by that of Charlebois (2006).

Definition—Relations of definition

- The Canadian government defined the beef as safe and the majority of respondents mimicked the rhetoric of government's dominant discourse. Concerns of alternative voices like Dr. Haydon, David Suzuki, etc. were not mentioned except by the PCTBC group.

5.4.2 **Science has limits**

Precautionary Principle

- The precautionary principle is embodied in the Food and Drug Act and is intended to protect the trust of consumers. Health Canada is in charge of implementing the precautionary principle. The PCTBC group reflected the views of other sub-political groups such as the NFU and the Canadian Health Coalition when they charged Health Canada with shifting from the precautionary principle to risk management, in other words "manage the damage" rather than preventing harm from occurring—these groups are demanding a return to the precautionary principle (EHANS, 2001).

- By 1985 Canadian officials were aware that BSE infected cattle were coming from UK therefore imported cattle were required to have BSE-free certification. However, some of the UK infected beef may have been rendered into Canadian cattle feed (Suzuki, 2005). In 1997, Canada banned feeding cattle protein to cattle but BSE was already in the animal feed system. In the UK, specified risk materials (SRM) such as the brain, spinal cord, and specific organs and tissues were banned from human food in 1989 but Canada did not initiate an SRM ban in human food until 14 years later in 2003. Thus, Canada did not apply the precautionary principle within a timely manner. Additionally, blood, milk, gelatin, rendered animal fat or other products of mammals (including cattle) are still permitted in cattle feed, as are pig and poultry by-products, which are fed SRM cattle products (Canadian Health Coalition, 2001; Government of Canada, 2004).
- An enhanced feed ban was scheduled to come into effect July 12, 2007 (CDC, n.d.). CFIA's new feed control regulations call for a ban of most proteins (including SRM) not just from cattle feed (as required by 1997 ban) but from ALL animal feeds, pet foods, and fertilizers. The fired Health Canada scientists had called for a ban on animal parts in all animal feed back in 2003 (Bueckert, 2004). These new measures will reduce the risk of any potential contamination during production, distribution, storage and use, as well as and cross-contamination of animal feeds. If the enhanced feed ban is enforced properly as of July 2007, CFIA expects to

eliminate BSE from the Canadian cattle herd in a decade. Again, the timing of this enhanced ban does not support the precautionary approach.

5.4.3 **Knowledge**

Alternative voices

- Former Health Canada scientists Dr. Haydon (plus Chid Chopra and Gerard Lambert) were fired in 2004 because they publicly criticized Canada's rendering policies as being inadequate for consumer protection. They had expressed concern to the government back in 1997, but were ignored. Additionally, they disclosed how Health Canada was being politically influenced by corporations, especially by the Canadian Animal Health Institute, which is a lobby for veterinary drugs (Suzuki, 2005; Curry, 2004)

Debate/Questioning

- A minority of respondents attributed the Canadian BSE to animal feed, even though the majority of BSE cases have been due to animal feed rather than atypical BSE.
- Only a small number of the producers indicated the BSE crisis got them thinking more about cattle feed and for those that did question the ingredients, they continued to feed regulation-approved feed, which still contains animal by-products. The sub-political producer group and one other producer questioned that animal by-products are still fed to herbivorous cattle and stated they only fed grass and grain-based products.

- Modern intensive agricultural practices were problematized only by the sub-political producer group and sub-political Representative.
- In Canada, there was no wide-ranging debate about the social aspects of BSE risk or the incapacity of the current political process to effectively deal with it.

5.4.4 Institutional decision-making

Stakeholders' interests

- Some believed that decisions about BSE-related regulation was based purely on science. However, some respondents, including the sub-political producer group, were concerned that regulations were influenced by social and political factors. These respondents were reflecting the views of other sub-political groups, who charge that corporate interests are affecting decisions.
- CFIA is currently responsible for both food safety standards and to find new export markets for beef, which the current Minister of Agriculture warns is inappropriate (Pratt, 2008).

Openness/ Transparency/ Denial

- The Canadian government was open and transparent about the BSE cases immediately after they were diagnosed. Information was relayed via the media, Alberta Agriculture and the CFIA, which respondents relied upon.
- On the day of Canada's BSE announcement, Agriculture Minister Lyle Vancliff declared that the first Canadian BSE animal did not enter the animal feed or human food chain; however, 18 months later it was

announced that the infected animal had entered the animal feed chain. This raises the question if the public was told that it entered the animal feed chain 18 months later because the information was unavailable until then or if it was a strategic delay (Suzuki, 2005).

- Respondents indicated that the beef industry needs to be more transparent, as do producers.
- Former Health Canada scientists were fired for providing information and advice contrary to the dominant view on inadequate regulations indicating government's lack of openness.

Regulation/Safety

- Having learned from the British BSE incidence in the late 1980's, Canada could have enforced a feed ban prior to 1997. Additionally, the feed ban could have been more stringent and better regulated. Problems with the ineffective feed ban are still being raised, as Canada reached its 12th BSE case (Pratt, 2008). A senior veterinary with the CFIA said officials knew the ban would not be 100% effective (Ibid). The CFIA did not recall old bags of cattle feed which still had rendered cattle. Additionally, the ban created two feed streams: one for cattle (could not contain cattle parts) and the other for pigs and chickens (could contain cattle parts). There was potential for cross-contamination on farm, feed mill or transportation, which indeed did occur. Only the sub-political producer group raised concerns that feed containing cattle are fed to chickens and chickens are fed back to cattle.

Institutions

- In Canada, new institutions of APRI and PrioNet were created in Canada after the BSE scenario to find scientific and socioeconomic solutions to prion-related diseases. These organizations funded studies that incorporate both the scientific and the value rationality aspect of BSE. For example, studies included public's risk perception, socio-economic impacts of the crisis, recommendations to include public in debates, adaptation, communication, etc. However, there is no evidence so far of questioning of intensive agricultural practices and the push for cheap meat.

Chapter 6 DISCUSSION

6.1 *Factors Inhibiting Learning*

A thorough analysis of why learning and changes did not occur to the extent of reflexive modernization to prevent future crisis is beyond the scope of this thesis. However, the following sections provide some possible explanations (Elliot et al., 2001):

Table 4. *Factors Inhibiting Learning*

Factors inhibiting learning	Evidence in case study
1. Inadequate problem definition	1. Economic versus health issue
2. Reductionist understanding or solving of complex events	2. Technocratic approach
3. Organized irresponsibility (trust, blame, exclusion)	3. Alternative voices were excluded
4. Inadequate regulation and enforcement	4. Late and ineffective feed ban
5. Complacency "it couldn't happen here" attitude	5. Belief it was a British disease
6. Rigidity of core beliefs, values and assumptions	6. No changes at government level to the extent of reflexive modernization
7. Ineffective communication	7. Some communication was ineffective
8. Information difficulties	8. Lack of information and uncertainty at beginning of crisis
9. Threat minimization	9. There are greater disease threats than BSE
10. Failure to recognize similar properties	10. Not learned from UK BSE crisis
11. Cognitive narrowing and event fixation	11. Focus on value-adding and export markets rather than system-wide changes
12. Centrality of expertise; denial and disregard of outsiders; vested self-interest	12. Exclusion and collusion

The challenge of organizations is their shared structure of meaning, frames, routines, and false assumptions entrenched in the decision-making process, all of which become part of the organizations' central paradigm. Change becomes difficult and effective learning is inhibited (Janis, 1972). Alternative views can shatter false assumptions and offer new perspectives, facilitating learning and

changes. In this case study, evidence points towards the exclusion rather than inclusion of alternative voices.

Additionally, the focus on single loop learning—usually technical—can perpetuate the dominant organizational discourse which may have caused the failure initially and can inhibit contestation of the decision-making process and cultural change (Elliot et al., 2001). The lessons Canada learned as outlined in the reports in Section 2.5 focus on scientific rationality (technocratic approach). Only the sub-political producer group and sub-political Representative showed evidence of double loop learning, which includes negative feedback and value-rationality. However, they were excluded by the dominant powers.

Cognitive narrowing can be caused by high levels of stress, where possible threats are believed to be just a function of technology or organizational practice rather than also as value-rationality (Elliot et al., 2000). Representatives and producers did indeed express feeling very high levels of stress during the BSE crisis, to which the lack of information and uncertainty contributed.

6.2 *Crisis Stages*

Failure to learn and change could have also occurred at the various levels of crisis. Pre-crisis is the incubation period, where core beliefs, assumptions and values direct the development and application of precautionary norms, which affect organizational activities and behaviours. The SRM ban was implemented late in Canada and then the ban in addition to enforcement was inadequate to prevent more BSE cases.

During the second phase, crisis event, there is minimal time for reflection and learning. Numerous respondents indicated that it was indeed a very stressful time, that *"everyone did the best they could"* and that decisions have to be made quickly or *"there's no point of doing it. So the faster you have to move, the more errors you'll make"* (Representative). A couple of representatives also felt that there was no *"guidebook"* on how to deal with the BSE crisis as it had never before occurred in Canada. Arguably, the UK experience could possibly have been used as a preventative and management guide. Boin and t'Hart (2003) point out leaders should prepare for worst-case scenarios but are reluctant to do so unless they have previous experience with crisis. The crisis debriefing is a learning opportunity but hidden errors must be detected: "The real solution would involve a deeper look into the causes of the crisis and how to prevent future crises" (Elliot et al., 2000, p.20). Based on the five reports on the Canadian BSE crisis in Section 2.5, the following main underlying causes were not detected or corrected:

- Modern agricultural practices—push for cheap meat;
- Lack of balance between value-rationality and scientific rationality;
- Exclusion of alternative voices;
- Power imbalance in the structure of the beef industry; and
- Stakeholder interests' political influence of decisions.

The last phase is post-crisis, which can be especially critical for learning (Elliot et al., 2000). There was no crisis of legitimation or loss of trust in

institutions in the Canadian BSE case. Perceptions of the various institutions changed, but their legitimacy was not debated, except by PCTBC and other sub-political groups. Institutional values and assumptions were not detected to have changed to a significant degree of reflexive modernization because the previous dominant paradigms were reinstated and normalization was sought (Charlebois, 2006). Therefore the social construction of reality remained reductionistic/scientifically rational and influenced by those in power.

Boin and t'Hart found that learning is more likely to occur post-crisis:

> [Learning] is a laborious process conducted away from the media spotlight and the turbulence of political and juridicial proceedings against top officials. Learning is often a matter of designing unheroic technological improvements and adapting bureaucratic routines…requiring patience, institutional memory and a low-conflict atmosphere (2003, p.548).

Opportunities for reform during a crisis can be limiting rather than encouraging because the requirements of crisis leadership are at odds with the requirements of effective reform (Boin & t'Hart, 2003). Considering Boin and t'Hart's research, significant changes in the Canadian system (and reflected by this case study) should not have been expected because the actions taken in the BSE crisis supported the crisis-management imperative more than the reform imperative outlined in Table 5.

Table 5. *Reform Versus Crisis-management Imperative*

Reform imperative	**Crisis-management imperative**
To build support for serious reform, frame crises as a consequence of flaws to delegitamize existing values and structures	Downplay the damage and restore order by endorsing existing values and structures
Reform leaders attempt to be convincing that they have a plan and present it as the only feasible policy option that will lead to a new and stable future	Crisis leaders restore political confidence in the effectiveness of pre-existing policies and institutions
Reform leaders manage to secure early support of implementing actors for their plans	Crisis leaders bypass routine policy-making procedures to speed up decisions

Note. Adapted from " Public Leadership in Times of Crisis: Mission Impossible?" by A. Boin and P. t'Hart, 2003, *Public Administration Review, 63*, p.549.

Due to pressure, the first priority of leaders during a crisis is usually to restore order rather than for reform. The Canadian Government and industry leaders continued to reinforce the view that previous policy decisions were adequate and Canadian beef is safe and thus averted public panic but simultaneously also decreased the opportunity for the crisis reform imperative and possible reflexive modernization.

Participants' responses varied on the source of leadership for change. Some believed leadership would have to come from industry or government, as the beef industry is complex and producers' are limited in what they are able to change. However, leadership in Alberta Agriculture was questioned because it has shifted the direction of agriculture towards a narrow perspective and also excluded *"visionary"* people. The most learning and changes observed in this case study was found at the producer level, especially innovative groups such as the PCTBC. Also, only one Representative exhibited tendencies towards reflexive modernization, but unfortunately he was also excluded. The finding that leadership for learning and changes to the degree of reflexive modernization is

found in a minority and are then excluded concur with Boin and Hart's findings that "leaders who seek to gain momentum for reform by echoing assertions that the current crisis is not so much a tragedy, but a fiasco of existing policies and organizations, are taking a big risk" (Boin & t'Hart, 2003, p.550).

6.3 *Economics, Interests and Power*

Economic considerations are a fundamental characteristic of capitalist-oriented countries, such as Canada. The Phillips Inquiry had identified that the key cause of BSE in the UK was the economic push for efficiency by producing cheap animal feed in addition to inadequate rendering and processing. BSE is just one of numerous examples throughout history, where "the separation of public management responsibility from policy responsibility, the tendency toward deregulation, private sector-oriented management styles and the strong emphasis on cost-cutting can easily lead to governments creating disasters" (van Duin, 1993, p.58). Boin and t'Hart (2003) also found that although the public expects leaders to prioritize public safety, instead, they often prioritize economic and political gains. Some crises have stimulated regulation restructuring and increased public awareness about the consequences of technology and the push for perpetual economic growth (van Duin, 1993). However, there is no evidence for such reflexivity in the learning and changes of the majority of respondents in this case study, especially the institutions in power. Beck considers policy based largely on ideals of economic efficiency as morally insufficient and he claims "that policy distributing environmental and social risk should include in its moral foundations other values so that it is legitimate and just" (Johnson, 2005). For

change, "eventually, effective and responsible crisis management will reconcile bottom-line economics and high politics with public duty" (Rosenthal & Kouzmin, 1993, p.10). Again, the argument for both scientific and value rationality for a balanced society is being returned to.

Marsden's research also provides plausible explanations as to why no significant evidence of reflexive modernization was found. The current industrialized food systems have experienced increasing number and magnitude of crises; the governments' response was to initiate the development of highly professionalized and bureaucratized forms of safeguards and instruments. These changes have been framed as being conducted for the sake of the consumers. However, the changes have allowed governments to protect their interests and allowed corporate industries to exploit new markets, "strengthen[ing] the economic and political power of established agro-industrial interests" (2004, p.142). According to Marsden, schemes for increasing regulation constrain the opportunity for integrated agricultural development and create barriers for smaller producers and processors to enter or remain in the market.

> For consumers, it allows the disconnections and distanciation between production and consumption to conveniently continue: with an encouragement that 'safety' comes before sustainability…[it becomes] difficult to make holistic connections…As a result it has been difficult for many actors to construct viable and integrated alternatives, or to harness the necessary spatial, natural, regional and knowledge-based resources necessary to progress real rural development options. (2004, p.142)

Barriers for small producers and processors were found in this case study, as the majority of producer groups who have attempted to develop their own niche markets or set-up their own processing facilities since 2003 have failed. Another

example is the upcoming changes in meat inspection regulations in British Columbia, where smaller-scale producers are not able to meet the stricter standards (BC Food Processors Association, 2007). In such an atmosphere, there is decreasing opportunity for consumers to lead a legitimization crisis. Marsden argues that "the paradox of the story to eradicate BSE and other risks from the industrial food chain has been that the regulatory responses to it have further embedded industrial systems of supply, processing, and retailing in the livestock and meat sectors" (2004, p.142). This embedding is occurring as the agro-food sector is creating what Marsden calls a "bureaucratic-hygienic apparatus" (2004, p.142), resulting in regulatory hygiene/safety controls that are demising small farms and disempowering primary producers. Interestingly, most contamination and food recalls originate from the larger facilities because of the push for speed and efficiency rather than from farms or smaller facilities (Marsden, 2004; Schlosser, 2002). For example, cattle raised under intensive operations are fed large quantities of grains for faster fattening, which can cause health problems and death. They are kept in feedlots in high concentrations which creates stress and increases disease transmission; thus, they are regularly administered drugs such as antibiotics. Packers like Lakeside slaughter an animal every 14.4 seconds (Heintzman & Solomon, 2004). In contrast, grass-fed and pasture-raised cattle, characteristics of smaller operations, have lower risk of carrying campylobacter and *E. coli* bacteria (Bailey et al., 2003; Jonsson et al., 2001; Russell et al., 2000).

The increase in standards is creating significant changes in the food retailing, restructuring the supply and distribution networks (Hendrickson &

Heffernan, 2002, p.358). Technological and regulatory treadmills are increasing the cost of production for farmers but they are not necessarily getting high financial returns for them (Renting, Marsden, & Banks, 2003), leading to a continual disempowerment of primary producers.

Hendrickson and Heffernan (2002) recommend analyzing the rising of food chain clusters to point out the possibilities for resistance and the development of alternatives. Additionally, it is critical to "understand the twined forces of agency and structure along the entire continuum of production/consumption " (Hendrickson & Heffernan, 2002, p.349). Marsden (2004) also touches on the need to examine exclusion and empowerment (of producers and consumers), marginalization histories, price flexing by large companies to push out smaller ones and monopolization of consumption spaces.

There are challenges which large firms face, creating potential space for alternatives (Hendrickson & Heffernan, 2002). The first is serving smaller differentiated markets (local communities send own market signals, can meet the needs of consumers with specific concerns). The second is difficulty reacting quickly to niche markets. The farm economy is predicted to split into two markets; one is large scale farmers in commodity production who depend on technologies and economies of scale to survive on razor-thin margins and the other focused on product-oriented, consumer-driven, end-user approach to agriculture production and processing. The third is developing trust with consumers. The fourth is the social and environmental problems large firms create—alternative food systems can adopt less damaging practices.

More than just creating space for alternatives, Beck envisions a political rearrangement in which new institutions are more open and democratic (Adam et al., 2004). Renting et al. also agree: "if we are witnessing the emergence of new rural economic relations out of the deepening crisis of industrial agriculture, it would seem that new institute practices and interventions will be needed both to stimulate and to foster these diverse trends" (2003, p.409).

The creation of policy must also be closely monitored. First, policy makers should be in close proximity to the diverse groups affected by problems needing resolution (MacRae & TFPC, 1999). Findings of this case study also confirm that "grass-roots people" are needed to work with producers to implement practical policies. Second, policies that will disempower primary producers and citizens must be challenged:

> There is a need, therefore, for rural scientists to contest these regulatory modes and to apply other, for instance, agro-ecological and food ecological models to rural realities. This will require us to explore contradictions and practices embedded in the different modes of environmental policy discourse, and for us to challenge the specificity of environmental expertise and professionalisation. (Marsden, 2004, p.143)

6.4 *Durable Social Movements*

Another explanation for why learning and changes to the extent of reflexive modernization was minimal is that perhaps there are more durable forms of social movement activity than that covered by Bourdieu's theory of crisis and by Beck's theory of reflexive modernization. Both theories assert that only during crisis are doxic assumptions/habitus questioned and new forms of praxis developed (Crossley, 2003). Crossley found that non-academic sources of reflexivity and

rational critique are often more constant than academic sources and part of more durable social movements. The movement towards change may emerge from time of crisis/cycles of contention but the most changes may occur during enduring times. Perhaps the consequences of BSE and the post-BSE *"perfect storm"* may create cycles of contention for producers that will lead to more frequent and widespread tendencies of reflexive modernization.

In contrast, research has found that struggles of powerless farmers only gained momentum and power when taken up as a good cause and invested by middle-class liberals (Jenkin and Perrow in Crossley, 2003). Social movements require more than radical habitus to generate protest. They require resources, even beyond economical/technological and social capital, such as symbolic and cultural capital. Crossley agrees that crises are important, as protests grow and more opportunities appear available, "...but crises are not the beginning or end of change, they are agitators...Crises, protests and movements are shaped by a variety of interacting factors, none of which is sufficient to bring them about independently, but each of which could be the 'final straw' that gives rise to mobilization..." (2003, pp. 62-63).

6.5 *Evaluation of Reflexive Modernization as a Theoretical Framework*

The theory of reflexive modernization was in many ways ideal for applying to the Canadian BSE crisis since it had been applied to the UK BSE crisis, thus providing clear examples. The theory incorporates aspects of other theories on crisis, such as trust, institutional organization, as well as scientific and value

rationality. The test criteria outlined by Beck brought the theory to a practical level. The test criteria points not utilized in this case study were excluded either because they were not applicable or too abstract to be tested.

One of the criticisms of the theory of reflexive modernization is that it simplifies reflexivity as if it were a spontaneous transformation. Reflectivity and reflexivity are contrasted, where reflexivity is considered indeterminate and immediate under circumstances requiring quick decisions (Beck et al., 2003). However, there is no further explanation of the process of reflexivity.

According to Mythen, the most striking imperfection of the risk society thesis is "a refusal to recognize the diversity of hermeneutic approaches which people employ in their routine encounters with risk" (2004:146). The complex association between risk, pleasure and desire is absent. In other words, Beck is criticized for putting too much emphasis on reason (positivist) and consciousness and not enough on unconscious desires and drives, which direct much, if not most, of human action. Mythen argues further that "in opposition to the universalism inherent in the risk society argument, a dense network of habits and dispositions will influence the way people respond to risk in the course of everyday life" (Mythen 2004:146). Lash critiqued Beck for focusing excessively on social structure and institutional rationality and neglecting the aesthetic and cultural drivers of reflexivity. Lash argues that the value-rigidity of the risk society model compels Beck to paint a simplistic, one-sided idea of contemporary subjectivity. Arguing against such reductionism, "Lash maintains that reflexivity is multilayered and must be understood in relation to a sweep of cultural practices

and behaviours" (Mythen 2004:147). Lash would argue that Beck is too nomothetic and not idiographic enough.

Beck is a reflexive modernist and not a post-modernist. His epistemology is anti-foundationalist and he falls under critical social theory, in the narrower sense with strong links to the older Frankfurt traditions despite extensive criticism of it (Morrow, Sep. 22, 2006). In opposition to being labeled, Beck strongly opposes any form of dogmatism, whether ontological or epistemological. He emphasizes "relations of definition" to provide a materialist basis for theorizing the ontology of risk in terms of 'impact'. This pragmatic stance protects his sense of 'materialism' without having to confess to any metaphysical belief. In the words of Beck "the decision whether to take a realist or a constructivist approach is for me a rather pragmatic one, a matter of choosing the appropriate means for a desired goal…I am both a realist and constructivist, using realism *and* constructivism as far as those meta-narratives are useful for the purpose of understanding the complex and ambivalent 'nature' of risk in the world risk society we live in" (Adam, Beck and van Loon 2004:29,212). Beck searches for ways to deconstruct bipolar oppositions by aligning himself neither with the realist-absolutist stance nor with the constructionist-relativist position, disassembling instead the borders between them. This involves shifting the discussion from epistemological and metaphysical concerns to socially oriented analyses of risk, technologies and ways of relating to the future (Adam et al., 2004). Elliot and Ray support Beck by providing the following explanation:

> Central to understanding the complexity of [Beck's] risk society thesis is a sense of the cultural dynamics that Beck stresses as being central to the "phenomenon" of risk. These cultural dynamics involve not only the pivotal role of sense-making and perception in the actualization of risk, but also what could be called the communicative logic that underscores the very possibility of action, of social movements, political parties, institutions, including science and mass media, and corporations. (2003:47)

The less risks are publicly recognized, the more risks are produced (Adam et al., 2004). Beck's core and optimistic argument is that the only way to manage the risks integral to rapid technological change is through a radically new openness – which requires new institutions that will both reflect and create more trust between the manifest social stakeholders and also the citizen who presently exists as a "virtual stakeholder"(Adam et al., 2004).

To make up for the shortcomings of reflexive modernization theory, the following theories could have been applied to this case study: social movements (including resource mobilization); community disaster response; institutional analysis (Foucault); political ecological approach; power, (Lukes); public sphere and collective learning (Habermas);habitus (Bourdieu); and rural sociology. Certain concepts in rural sociology would apply well in the context of the Canadian BSE crisis because they are specific to the agricultural sector. Buttel, Larson and Gillespie (1990) have identified numerous trends and gaps in the sociology of agriculture. There is an increasing trend in the sociology of agriculture to include vertical commodity systems (e.g. international cattle complex) and horizontal rural social structures in the analysis of agricultural issues. Also, periods of agrarian crisis are being used as key test cases for examining sociological positions about agricultural change. One of the gaps in

the sociology of agriculture is an understanding of how policies are determined, rather than how to influence policy, which van Zwanenberg and Millstone emphasize (2005). Another gap is there needs to be a better understanding of the relationship between the contemporary farm crisis and both the crisis of accumulation in the world economy as a whole and its current restructuring process. A third gap is there needs to be more critical ethnographic fieldworks to examine the role of structure and agency.

Chapter 7 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

7.1 *Summary*

As mentioned in the Introduction, there are two divergent perspectives on the BSE crisis. The first is that Canada had learned numerous lessons and BSE will be eliminated. The other view is that the lessons have not been learned to the degree of reflexive modernization and that food crises, like BSE, are just the beginning.

In general, this case study found evidence of learning and changes among producers and representatives of various institutions. The most significant and swift changes occurred among beef producers as well as institutions dealing with safety, such as the CFIA and packing plants. Producers' actions were mainly at the farm level, such as cutting costs and attempting to market own beef. Even though feed ingredients were questioned, the majority of producers continued to use regulation-approved feed containing animal by-products, despite the evidence of contamination from an ineffective feed ban. The CFIA made traceability and regulation changes (removed SRM). Industry improved equipment and increased compliance. The slowest changes were in government (except CFIA) and involved mostly programs of financial assistance and producer-related learning such as financial management and marketing. Although there was an increased understanding of the role of various institutions during the crisis, incomplete understanding lead to mistrust and criticism. The cooperation and relationships built and strengthened between various beef industry players during the crisis was

unprecedented and contributed to the success of dealing with the crisis; however, more cooperation and not just during crisis would benefit the entire beef industry.

The learning and changes by the majority of producers and dominant institutions did not exhibit tendencies of reflexive modernization since they focused on technical rationality and excluded value rationality; furthermore, they did not question or mobilize against the deep-rooted problems in modern agricultural practices and related institutions, as voiced by sub-political groups. The following factors may have limited reflexive modernization:

- ***Definition.*** All respondents defined BSE as an economic crisis rather than a human or animal health risk. Only the sub-political producer group defined it as a human health risk and as a symptom of a flawed agricultural model, mirroring concerns of other sub-political groups. The framing as safe may have significantly reduced the severity of the crisis during BSE by encouraging citizen's confidence in beef—as indicated by the increase in beef consumption—as well as confidence in the institutions responsible for food safety. However, the framing simultaneously constrained local discourse on the broader implications of the BSE outbreak, such as cattle feeding practices and the intensity of modern industrial agriculture.
- ***Exclusion:*** The concerns of sub-political groups were excluded and so their voices were not echoed by a greater majority.
- ***Power, Interests, Economics:*** Oligopsony of the Canadian beef industry has created dependency among producers. Political interests are influencing decisions and are not being acknowledged.

- Other factors which can inhibit learning as detailed in Table 4.

7.2 *Conclusion*

When the consequences of a risk result in an actual crisis, it can be an opportunity for learning and changes (Beck, 1992; Dror 1993; Elliot et al., 2001; Habermas, 1987; Rosenthal & Kouzmin, 1993). A crisis can threaten, dislocate or destroy the existing discourse and reveal the faulty foundations of society, such as the incompleteness of its institutions, causing members of society to (re)evaluate the roles and effectiveness of key institutions. Our current institutions rely on scientific rationality to assess risk. However, no issue is purely scientific and all the answers will never be known. For example, BSE risks cannot be calculated because there is radical uncertainty—more information and knowledge will not resolve the uncertainties (Adam et al., 2004). Even if the science behind the disease was completely understood, value rationality would still need to be included to determine the acceptability of the risk. Additionally, the human fallibility element must also be considered, as mistakes are made in the system. Therefore the risk definition of BSE must include value-rationality.

The results and analysis of this case study indicate that scientific rather than value-rationality was emphasized by the majority of respondents. Additionally, there was no substantial evidence of previously doxic assumptions and states of affairs being called into question and acted upon, such as cattle feeding practices, the intensiveness of modern agriculture, and the politics of science, except for the sub-political producer group. The findings of this case study indicate that learning and changes did occur to some extent, but not to the

extent required for reflexive modernization, in other words, to the extent that BSE and potentially other food crises do not occur again. Changes in the food supply such as lengthening the food chain and using new technologies will also increase the incidence of food safety issues and crises (Lobstein, 2001; Goodman & Redclift, 1991). Turbulence, like that created by food crises, can be dealt with using two methods. The first method is to restore the authority of the old boundaries and the second is to incorporate uncertainty and insecurity into an institutional learning process (Beck et al., 2003, p.20). In this case study there is more evidence for old boundaries being restored rather than for institutional learning, as was also found by Charlebois (2006).

This research also did not find evidence of public debate on BSE. This is important because the less risks are publicly recognized, the more risks are produced (Adam et al., 2004). Furthermore, it is important because Beck suggests "public discussion of modernization risks *is* the route for the transformation of mistakes into opportunities for expansion under the conditions of reflexive scientization" (1992, p.161). If a society were progressing specifically towards reflexive scientization, and more generally towards reflexive modernization, the idea "it could be different" would increasingly come to dominate (Ibid p.175). There was no significant evidence of such progression based on the interviews, rather, tendency towards regression was found: the sub-political interviewees who envisioned and exercised agency towards a different reality were excluded.

Trust in scientists and government remained high, preventing a legitimation crisis and thus agents did not greatly increase their demand for new methods in the search for knowledge, as substantiated by Charlebois' findings (2006). The Canadian governments tried to reassure the public and minimize panic, ensuring that the bases of certainty were not eroded or publicly recognized. The success of the government's message of reassurance was strengthened by government being the most frequently cited expert. Beck et al. found the following:

> New objects of investigation and new lines of research more often than not turn up new risks and side effects, and in the process undermine not only the claims of rationality but also those of control. In Britain, rather than focusing on and resolving the crises, the established processes of 'crisis resolution' set off new chain reactions – loss of confidence, the collapse of markets, the struggle over assigning blame and the virtual abolition of borders – that created even more turbulence…(2003, p.17).

In this case study, there was no significant new chain reaction found since confidence was not completely lost in the Canadian and Albertan government or the food system and the domestic market did not collapse due to lack of consumer support.

Table 6. *Issues BSE Highlighted in the UK and Canadian Context*

UK (Murphy-Lawless, 2004):	**Canadian context (case study findings):**
Modern agricultural policy	Yes feed ban but no broader context
Effects of intensive farming	No, intensive farming is increasing
Threat of zoonoses	No, emphasis was on economics, not animal or human health issue
Role of government in ensuring safety of human and animals health	Minimal questioning of government's role except for sub-political respondents
How scientific uncertainty was translated into risk judgments and policy decisions	Only sub-political producer group questioned the politics around policy making
Who influences decisions and how	Questioning only by sub-political respondents

BSE did serve as an opportunity for learning and changes to some extent; however, it is not the only factor, and potentially not the most important factor contributing to changes since 2003. The timing of BSE in the cattle cycle and factors pre and post BSE have generated the *"perfect storm"* to create a crisis of far greater magnitude for producers. The finding that long-term chronic hardships pose a much greater threat to the survival of agricultural communities than brief crises may guide decision-makers towards policies that ensure the long-term viability of the beef industry. The beef industry is an integral part of Alberta's economy. The oligopsony of the beef industry has pervaded for over 120 years and has created an unfair marketplace and dependency among producers. Alternative marketing and processing facilities have been attempted but along with the Goliath competition, institutional policies have also created obstacles, decreasing the ability of producers to take agency and improve on their circumstances. Beck's core and optimistic argument is that the only way to manage the risks integral to rapid technological change is through a radically new openness, requiring new institutions that are reflexive and open, democratic and legitimate, as well as more trust between various stakeholders (Adam et al., 2004). When society begins to question institutionalized answers and approaches to problem-solving, and begins to ask "Do we really want or need this?", it will shift towards reflexive modernization rather than modernize as "means without an end". A debate with multiple voices may reveal innovative solutions. It is important to foster the development of citizens that are creative and prepared to tackle future challenges, especially in the agriculture industry.

Reflexive modernization demands acknowledgment and critical discourse on risk signals such as BSE. These above-mentioned factors validated pre-existing tendencies that prevented reflexivity. Although current practices have reduced the likelihood of more BSE cases, the conclusion cannot be made that the BSE crisis will not be repeated in Canada. Moreover, the same factors that prevented reflexivity in the BSE crisis may play a role in turning food safety issues into crises in the future, especially if the concerns of alternative voices are not heard.

The proverbial but perplexing question about social movement arises—how can people be motivated to learn and change to the degree of perspective transformation and emancipatory action? Education and resource mobilization are crucial (Crossley, 2003). But first, Crossley suggests citizens must get a "taste for contention" (Ibid, p.64). The consequences of BSE and the *"perfect storm"* post-BSE might just leave sufficient dust in producers' mouths that they indeed get a taste for contention and are mobilized to unite and gain greater power for action.

7.3 *Recommendations*

This section outlines recommendations based on interviewees' responses, literature review and the researchers' assessment. The following suggestions are based on van Zwanenberg & Millstone's (2005) research on how science can be positioned in the policy decision-making processes in ways that are democratic without being anti-scientific and scientific without being anti-democratic.

- Separate regulation from sponsorship: currently the CFIA is not independent as it enforces animal health and food safety standards and is also responsible for finding new export markets ("Five tough years", 2008).
- Outline and enforce procedural guidance to scientific committees for openness and transparency, committees to deliberate openly, public sessions: former Health Canada scientist Dr. Haydon was fired for critiquing inadequate BSE regulations. Additionally, there was no public debate in Canada about BSE.
- Recognize and report uncertain and incomplete knowledge: scientists do not fully understand prions, yet definition and policies did not include the uncertainty and certainly not to the degree of applying the precautionary principles in a timely manner. In addition, alternative voices which were expressing uncertainty were silenced.
- Combine science with policy, explicitly articulate risk assessment policies: in Germany and other European countries, reformed institutions have been set up along Red Book/Co-evolutionary model but risk assessment policies

have not been articulated by those responsible for risk management policy making. Canada did set up APRI and PrioNet for prion research but not along reformed institution model.

- Van Zwanenberg and Millstone (2005) suggest a co-evolutionary model of policy-making (see Figure 5), which highlights the fact that science is not independent of historical, socio-economic and political influences/contexts. Both in the UK and Canadian context evidence indicates that scientific decisions made were influenced by social and political forces. In the Canadian context, sub-political groups (including interviewees) believed that BSE should be examined in a broader context, including the historical content and stakeholders' interests.

Although Germany has not made changes to a large degree, it is the most exemplary (Beck 1992; Beck et al, 1994; Lobstein, 2001; van Zwanenberg & Millstone 2005)

- In risk society theory, environmental problems are at the centre of institutions rather than as external problems and this approach is already being applied in Germany.
- Germany considered the health of the consumer to be the main priority and thus applied the preventative approach by banning export of beef from UK without scientific evidence (also applied by other European countries and UK consumer groups).

- The core beliefs values and assumptions of those in power must change in order to redefine a problem. For example, Germany examined intensive agriculture and chose to focus on farming quality rather than quantity.

Other Recommendations:

- Promote a holistic approach to learning from crisis, as well as a socially responsible approach that examines the underlying causes and events (Elliott et al., 2000, p.18). Promote programs and organizations that have a holistic approach, for example: Leopold Centre for Sustainable Agriculture and Allan Savory's Holistic Management (focus is on long-term and "triple bottom line").
- Promote the balancing of scientific and social rationality. More research on value versus technical rationality is needed as it is neglected in research (Elliott et al., 2000).
- The majority of respondents were concerned that smaller independent farmers are being replaced by mega corporations and they accepted this fate; therefore, support producers who are attempting to sustain their smaller-scale farms and remove unnecessary obstacles.
- Create a program ensuring baseline standard of living for western producers, as exists in Québec.
- Create opportunities for producers to become as powerful as producers in Québec.

- Support extension programs with on-the-ground workers, as they have been identified as being very instrumental to producers.
- Educate the public about the true consequences of cheap food and support organizations who advocate for sustainable and equitable agricultural practices.
- Incorporate historical perspective and power-relations when examining issues.
- Promote public debate on food issues and include alternative perspectives.
- Foster creativity and innovative thinking.
- Promote a co-evolutionary model of science and policy-making (as recommended by Van Zwanenberg and Millstone, 2005), in which scientific deliberations are situated in social, political and cultural contexts.

Areas of Further Study:

- Research the forces of agency and structure along the production/consumption continuum (including history and exogenous factors).
- In-depth case studies of groups/organizations attempting to serve alternate markets. What are the challenges/barriers and how could they be overcome?
- Research issues of power, including exclusion processes.
- Research processes of reflexivity, including triggers.

- Research the differences in similarities in history, ontology and epistemology (and consequently problem-solving approaches) between producers who can be categorized as "alternative" or sub-political and those considered "conventional".
- Examine current problem-solving approaches, including regulatory modes, and apply a more holistic approach, such as food/agro-ecological models.

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Chapter 9 APPENDICES

Appendix A: Acronyms

AAFRD	Alberta Agriculture Food and Rural Development
AAMDC	Alberta Association of Municipal Districts and Counties
ABP	Alberta Beef Producers' Association
ABISF	Alberta Beef Industry Strategic Framework
ACA	Alberta Cattlemen's Association
ACFA	Alberta Cattle Feeders Association
AESA	Alberta Environmentally Sustainable Agriculture
ARECA	Agricultural Research and Extension Council of Alberta
AUMA	Alberta Urban Municipalities Association
BIC	Beef Information Centre
BSE	Bovine Spongiform Encephalopathy
CAIS	Canadian Agricultural Income Stabilization
CBEF	Canadian Beef Export Federation
CCA	Canadian Cattlemen's Association
CDC	Centre for Disease Control
CFIA	Canadian Food Inspection Agency
EHANS	Environmental Health Association of Nova Scotia
EU	European Union
FMD	Foot and Mouth Disease
MBM	Meat and Bone Meal
NFU	National Farmers Union
OIE	Organisation Mondiale de la Santé Animale (World Organisation for Animal Health)
PCBFA	Peace Country Beef and Forage Association
PCPB	Peace Country Premium Beef
PCTBC	Peace Country Tender Beef Co-op
SARDA	Smoky Applied Research and Demonstration Association
SSCAF	Standing Senate Committee on Agriculture and Forestry
SRM	Specified Risk Materials
TSE	Transmissible Spongiform Encephalopathy
vCJD	new variant Creutzfeldt-Jakob Disease
UK	United Kingdom
USDA	United States Department of Agriculture

Appendix B1: Information Sheet

You are invited to participate in a research project entitled "A case study of the BSE Crisis as an Opportunity for Learning and Changes". This is the project of Eva Bogdan, a Rural Sociology Masters student from the University of Alberta and Dr. Debra Davidson, Associate Professor, of the University of Alberta. The project is being funded by the Alberta Prion Research Institute; however this Institute will not have access to any of the data collected. The purpose of the research is to explore how beef farming communities have responded to the BSE crisis in terms of changes in their perceptions of Canada's beef industry and various supportive institutions, in their production practices, and/or organization of beef farmers' associations. The research project will begin in October 2007 and is expected to be completed in August 2008. You will be asked to spend 1-1.5 hours in a personal interview with one or two of the researchers noted above. The interview can take place at a time and location of your choosing. We would like to audio-record the interview, but you may refuse to have this done, in which case the researcher(s) will take written notes.

Individuals who participate in the research may be asked to share information about their education, farm, agricultural practices, beef organization, reaction to the BSE crisis, local media, and support systems. One potential risk to individuals participating in this research project is that others may be able to identify you based on the information you provide, or your organizational affiliation. Benefits of participation include knowledge sharing between the researchers and the community and the creation of research tools for the community,

Participation in this project is completely voluntary. If you do decide to participate, you have the right to withdraw from the study at any time, without penalty, up to two weeks after the interview has taken place, simply by contacting one of the researchers. As well, you have the right to refuse to answer any of the questions asked. The researchers can identify your interview with an alias or number, or you may be personally identified, whichever you wish. Access to data collected, including the coding list, will be limited to Eva Bogdan and Dr. Davidson, as well as 3 or 4 collaborating researchers associated with the University of Alberta. When the study is completed, data will be permanently held by Dr. Davidson.

The information you provide may be accessible to the public in the future in the form of Eva Bogdan's Masters Thesis and/or research papers published by Eva Bogdan and Dr. Davidson. If you decide to participate, you will receive a $10 honorarium to compensate and thank you for your time.

Eva Bogdan can be contacted at ebogdan@ualberta.ca or (780) 920-1742.
In the case of any concerns, complaints, or consequences, contact Ruth Butler, Administrative Support to the AFHE Research Ethics Board, 2-14

Appendix B2: Telephone and E-mail Script

My name is Eva Bogdan and I am a graduate student at the University of Alberta. I am inviting you to participate in a study on how beef producing communities have responded to the BSE crisis in terms of changes in their perceptions of Canada's beef industry and various supportive institutions. We are hopeful that this research can contribute to the development of improved agricultural crisis response strategies that address the needs of local producers and their communities.

The interviews will begin October 16 and participation will require spending 1-1.5 hours in a personal interview with either me or me and Dr. Debra Davidson, who is also with the University of Alberta. The interview will take place at a time and location of your choosing. You will be asked to share information about your education, farm, agricultural practices, beef organization, reaction to the BSE crisis, local media, and support systems. Participation will be completely voluntary and you will have the right to withdraw from the study or refuse to answer any of the questions asked. If you decide to participate, you will receive a $10 honorarium to compensate and I will thank you for your time.

Would you like more information or do you have any questions regarding this study before deciding if you are interested in participating?

In the case of any concerns, complaints, or consequences, contact Ruth Butler, Administrative Support to the AFHE Research Ethics Board, 2-14 Ag/For Centre, University of Alberta, Edmonton AB T6G 2P5, Ph. (780) 492-8126.

Appendix B3: Participant Consent Form

___I understand that I have been asked to participate in a research study and have received a copy of the Information Sheet. I understand the risks and benefits involved, and have had an opportunity to ask questions about the project. I understand that I can choose not to answer any or all of the questions that are asked and can stop the interviews or withdraw (quit) the project at any time without prejudice or consequence. I consent to the researchers using the results of my interview for the purposes specified in the Project Summary.

_____I consent to the interview being audio recorded.

_____ I DO **NOT** consent to audio recording and would prefer that the researchers only took hand written notes.

___ I DO want my name to be shared in public documents/ presentations.

___ I DO **NOT** want my name to be shared in public documents/ presentations and would prefer that the researchers attribute my interview data to an alias or number.

Interviewee Name: _____

Signature: _____Date: _____

In the case of any concerns, complaints, or consequences, contact Ruth Butler, Administrative Support to the AFHE Research Ethics Board, 2-14 Ag/For Centre, University of Alberta, Edmonton AB T6G 2P5, Ph. (780) 492-8126

Appendix B4: Interview Instruments

Research Questions

These questions may be modified or some more emphasized than others so as to incorporate or encourage emergent themes or phenomena. The overall research question is whether or not the BSE crisis served as a learning event; the core research questions are as follows:

1. Has perception of the beef industry and safety regulation changed since the BSE crisis?
2. What actions were taken to respond to the BSE crisis?
3. Which institutions have been instrumental and supportive in helping farmers and organizations reach their goals?
4. Which 'experts' were referred to for information on BSE? What were the information sources?
5. What can be done to better prepare the community for agricultural crisis?

Interview Questions

A. Beef Farmers

- Age, sex and education.
- Description of farm, such as the size of land, what is produced and number of livestock, how long in production?

1. Can you tell me how the BSE outbreak in 2003 affected your community?
2. How did it affect your own livestock operation?
3. Have you made any changes to your operation as a result?
   Possible probes: Did you reduce your herd? Diversify? Change feed regimens?
4. What do you think is the cause of recent disease outbreaks in farming, like BSE, and foot and mouth disease?
5. Do you think scientists will be able to eventually provide solutions to such livestock diseases?
6. Do you regularly incorporate new agricultural information and technology into your operation?
   (If so) Where so you hear about the information and technology you use?
   (If not) Why not?
7. What does the future hold for your operation?
   What are the greatest threats?
   What are your sources of support?
8. What do you think is the role of the farmer in society?
   Is that changing?
9. What were the conversations on BSE like and where did they take place?

B. Government/Industry Association members

1. Tell me how the BSE outbreak of 2003 has affected the Peace River community/ (or, if provincial representative) beef producing communities in Alberta?
2. What steps did (organization) take in response?
3. Are you satisfied with how (organization) responded?
4. Would you have done anything differently, if you had the chance?
5. Has this event had a lasting impact on (organization)?
   In what way?
6. Are you confident that (organization) can prevent or at least minimize future outbreaks?
7. What do you think is the cause of recent disease outbreaks?
8. Do you think scientists will be able to eventually provide solutions to such livestock diseases?

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Appendix B5: Confidentiality Agreement

I,_____, have been hired to transcribe the interviews from this project.

I agree to -

1. keep all the research information shared with me confidential by not discussing or sharing the research information in any form or format (e.g., disks, tapes, transcripts) with anyone other than the Researcher(s).

2. keep all research information in any form or format (e.g.,disks, tapes, transcripts) secure while it is in my possession.

3. return all research information in any form or format (e.g.,disks, tapes, transcripts) to the Researcher(s) when I have completed the research tasks.

4. after consulting with the Researcher(s), erase or destroy all research information in any form or format regarding this research project that is not returnable to the Researcher(s) (e.g., information stored on computer hard drive).

5. other (specify).

_____ _____ _____

Print Name Signature Date

Researcher(s)

_____

_____

Print Name Signature Date

_____ _____ _____

Print Name Signature Date

In the case of any concerns, complaints, or consequences, contact Ruth Butler, Administrative Support to the AFHE Research Ethics Board, 2-14 Ag/For Centre, University of Alberta, Edmonton AB T6G 2P5, Ph. (780) 492-8126.